# THE IRON AGE

**A Review of the Hardware, Iron, Machinery and Metal Trades.**

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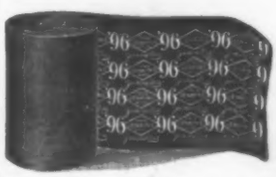

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THE IRON AGE

Thursday, January 5, 1905.

# The Manufacture of Cast Iron Car Wheels.

**As it is Done at the New Plant of the Pennsylvania Railroad at South Altoona, Pa. This is the Largest and Most Modern Plant of its Kind in Existence. It is Designed to Have a Capacity of 900 Wheels a Day.**

## The System and Special Appliances Insuring Rapid and Economical Production.

What may doubtless be regarded as the most modern systematic and continuous example of foundry practice in this country is furnished by the new car wheel foundry of the Pennsylvania Railroad at South Altoona, Pa. Here the ever increasing demand for the thousands of wheels required annually over its system is to be met by the company itself. For many years the company has been producing cast iron wheels at its foundry at Altoona, but in recent years the product of this plant has been entirely inadequate to keep pace with the rapidly growing demands of the system. At the old plant wheels are still made in the usual manner. But when the company decided to greatly increase its output of car wheels by the construction of an entirely new plant it was realized that there was an opportunity to bring into being ideas of what a modern car wheel plant should be. The chance was seen of giving form to ideas and a system which have been the culmination of years of mooted plans, unfulfilled because of their radical departure from existing lines. To adopt them meant to discard all of the old, and this necessitated a new plant.

Although the entire plant is not yet in full operation, enough of it has now been through a practical working test of sufficient duration to prove its great worth and real advancement over ordinary methods.

Fig. 1.—A View on One of the Molding Floors, Showing How the Work on Four Molds on Each Floor Progresses Simultaneously. This is Facilitated by Means of the Electric Hoists Working Four Abreast.

The most interesting feature of this plant, the one that strikes one most forcibly when entering the plant and impresses one with its importance at once, is the continuity of operations—the uninterrupted progress of the metal from the cupolas to the annealing pits. Each movement is noticeably timed to a nicety. Each follows in its proper sequence, and the result is a steady, continuous and apparently automatic stream of production. The secret of this lies, of course, in the handling facilities. For operating these electricity is employed entirely. Two systems are used. The overhead comprises numerous electric traveling hoists and a special type of electric traveling crane. The tramway system is employed chief-

ly to handle the ladles between the electric hoists and the cupolas, and again to take the hot wheels from the electric hoists to the annealing department. Thus it will be seen the railways carry the molten metal to the molding floors and the completed wheel away, while the electric hoists perform their function during the actual work of casting and, of course, molding.

The next important step is the method of utilizing these appliances. To understand this readily it will be necessary to become familiar with the general scheme of layout of the molding floors. In the first place, as a glance at Fig. 13 will show, the great foundry building is composed of a series of 13 bays arranged side by side. Two of these bays at each end are utilized for annealing and cleaning departments. The nine bays in the intervening space are divided into three units, each possessing its own pair of cupolas, so that it may be operated separately if desired. Then, again, each bay is divided into four floors, or rows, of molds, making 12 floors for each of the three units. Each floor contains 25 molds.

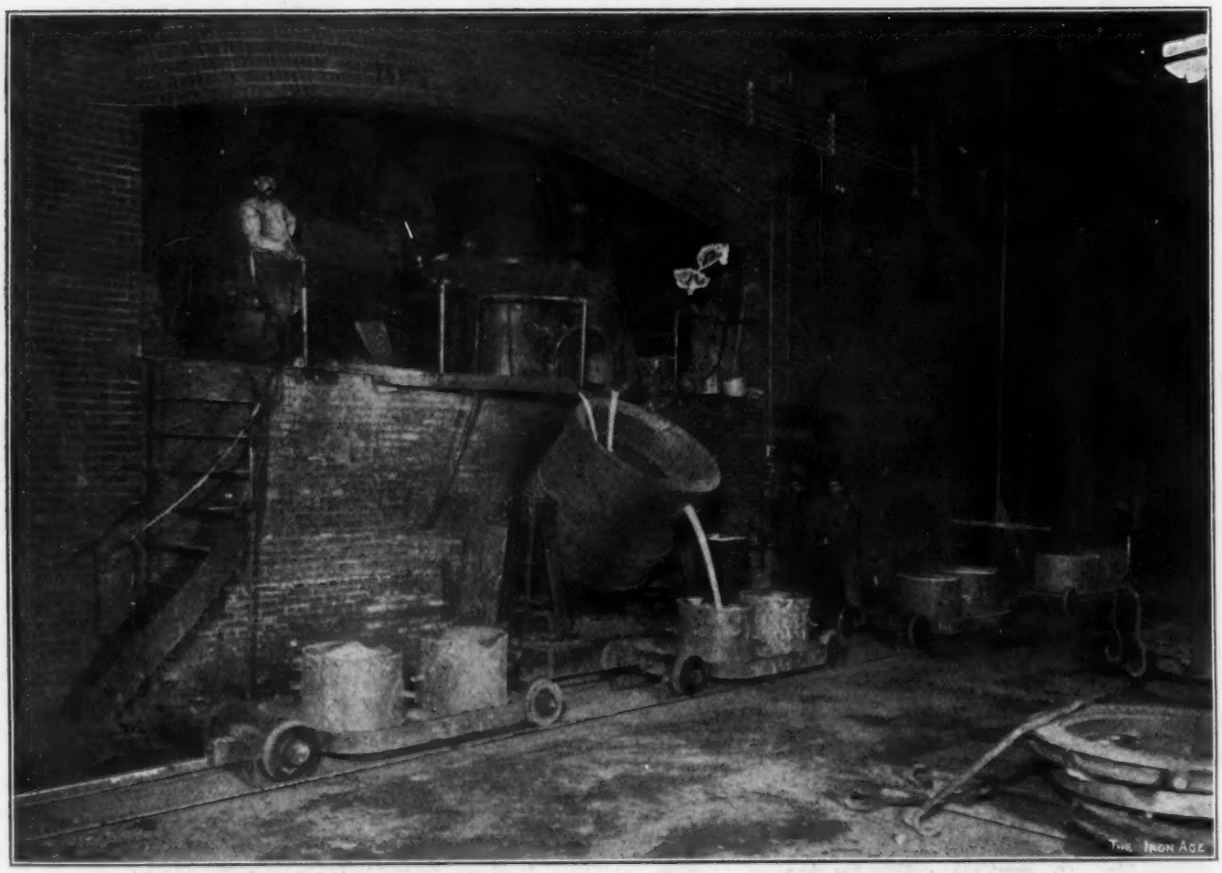



Fig. 2.—The Tap Running the Metal from Two Cupolas into a Reservoir, from Which it is Poured into the Ladles on Special Cars. The Cars Are Then Run to the Desired Floors and the Ladles Are Picked Up by the Electric Hoists.

## THE SYSTEM OF OPERATION.

For detailed description of the system we have selected the middle unit of 12 floors. This, in fact, is the only one fully equipped and in operation at this time. Thus it will be seen the present capacity of the plant is 300 wheels per day, while the ultimate capacity will be 900 wheels daily. In view of the fact that each bay contains four floors, or rows, this figure is taken as a basis for all operations. All things are done in fours. That is the chief point of the system.

The forenoon of each day is taken up by the work of molding. One molder is placed in charge of each floor, or line, of 25 molds. He has two helpers. Each wheel is numbered, the number being cast on it so that its record can be kept right from its very origin. The molds are arranged so that the numbers begin at the west side of the plant and work east toward the cupolas. In all operations the work progresses in numerical order, starting with the lowest number. The four molders in each bay and their gangs of helpers vie with one another to finish their row first, and, of course, as they are directly responsible for results on their floors, it is to their interest to produce perfect wheels throughout. Directly over each line of molds there is a runway containing an electric traveling hoist which runs from east to west, parallel with the row of molds. Beginning work in the morning the four molders in each bay run their hoists to the extreme end of their floor and from there progress four abreast toward the cupola. Each man having his own hoist to manipulate the copes and drags, no delay in the waiting for crane service is encountered. In Fig. 1 it will be seen the men are pretty well down toward the end of their floors. As is the case with all of the photos reproduced in this article, this figure shows the work proceeding in its regular manner, as the photographs were all made by instantaneous exposure while the work was in progress. To maintain a level floor for the molds they are placed on a pair of light weight steel rails which are permanently true, being firmly set in the ground on wooden ties.

At about 11 o'clock the blast is turned into the cupolas and within an hour the work of pouring begins. As is shown in Fig. 2, the metal is run into a tilting steel reservoir, from which it is poured into the ladles, which are set on special trucks. Four of these trucks are coupled together into one train, and each at the start contains two ladles. As the work progresses only one ladle is filled on each truck, the empty space on each truck being provided for depositing an empty ladle when a filled one is taken off. In Fig. 2 will be noted two men stationed on the floor near the cupolas. One operates the reservoir by means of the lever, which he is holding in his right hand, while the other operates an ordinary electric controller in connection with the movement backward and forward of the ladle cars. Immediately after four ladles are filled they are run to the desired bay and are picked up by means of the electric hoist after the empty ladle is deposited on the truck. The hook and operating lever of one of these hoists are shown on the right of Fig. 2.

Taken up by the hoists, the four ladles advance together to the proper quadruplet of molds waiting to be poured. The four molds are poured simultaneously, as

Fig. 3.—Pouring Four Molds Simultaneously, the Ladles Being Suspended by Means of the Electric Hoists.

Fig. 4.—Rear View of the Pouring Operation, Showing How Closely the Work Progresses Throughout the Entire Length of the Foundry.

Fig 5.—Knocking the Sprues and Sand Out of the Hot Wheels. This is Done While the Wheels Are Still at a Red Heat, Being Suspended by Means of the Electric Hoists.

Fig. 6.—After the Operation Shown in Fig. 5 the Hot Wheels Are Carried, Four at a Time, to the Extreme End of Each ... Where They Are Deposited on Special Trucks, which Carry Them to the Annealing Department.

shown in Figs. 3 and 4. The ladles are then returned to the trucks and this process is repeated. After three or four sets of wheels have been poured in this manner the ladles are taken to the end of the bay and placed upon the floor, so that the hoists are free for the next operation. This consists of taking the hot wheel from the mold and knocking the sprue and sand off of it. This is performed as shown in Fig. 5. By means of the electric hoist the cope and chill are removed, and the wheel, at a cherry heat, is picked up and elevated slightly by the hoist, an ordinary hook and prongs being used, as shown

cially constructed trucks, as shown in Fig. 6. These trucks are designated as wheel trucks and are operated on a system similar to that employed with the ladle trucks. They are hauled by means of an endless cable wound about a drum attached to an electric motor. The operator's platform is elevated at the south end of the building, being shown in Fig. 7, and his controller is so equipped as to indicate the exact position of the truck along the floor. When the foundry is in full operation a duplicate system will be provided and each will cover one-half of the plant, one train running to the annealing

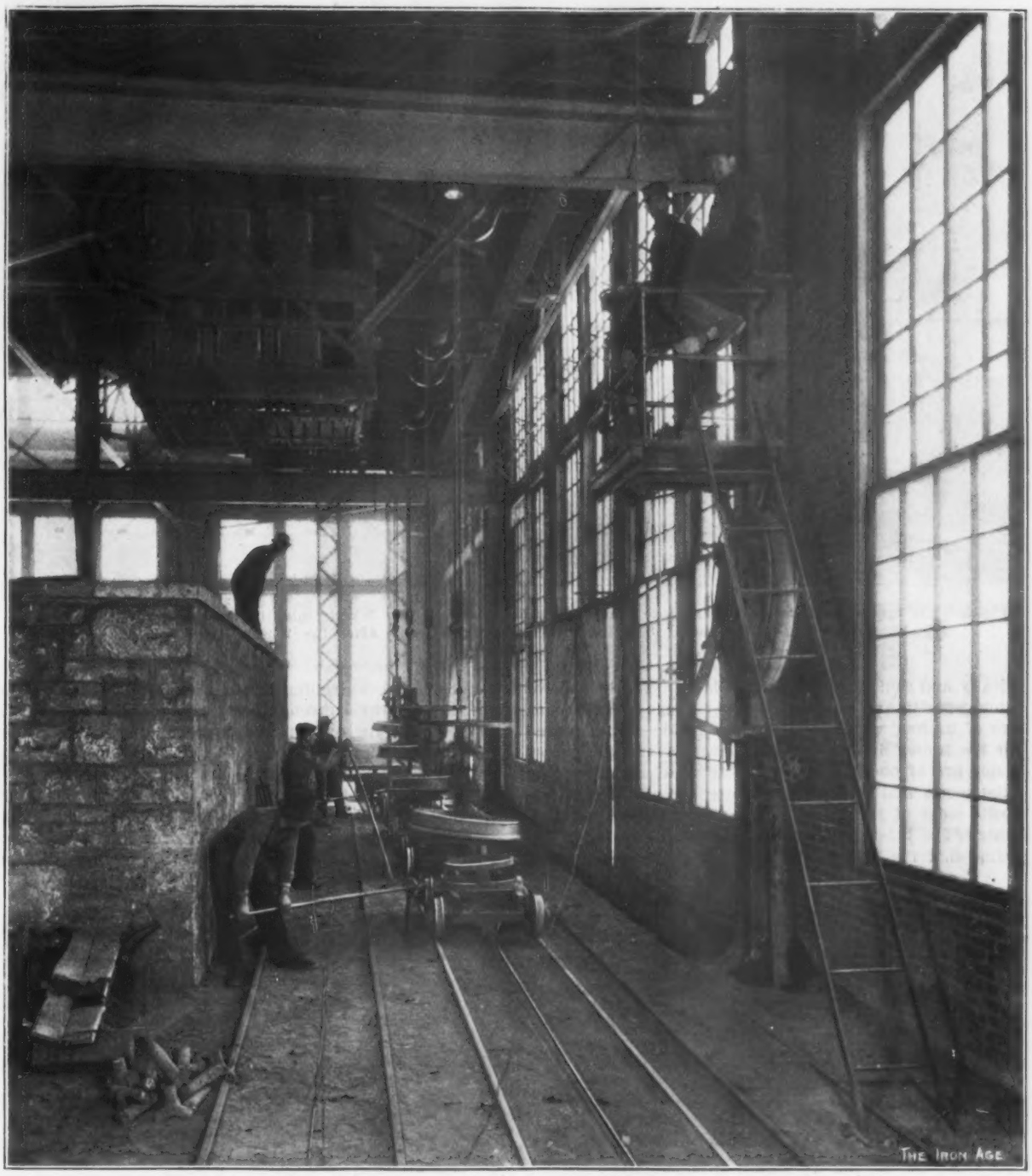



Fig. 7.—Arriving at the Annealing Department, the Hot Wheels Are Lifted from the Four Trucks Simultaneously by Means of a Special Four-Hoist Electric Traveling Crane. The Wheels Are Picked Up by Means of Automatic Tongs.

in the engraving. Sledges are then taken to break away the sprue, and the wheels are bit on their rims to cause the greater portion of the adhering sand to drop off. The illustration shows how small an interval of space is kept between the cast wheel and the preparations for the next day's molding. It will be observed that the cope and drag for the next day's mold are in readiness at a space of but one mold to the rear.

Denuded of most of the clinging sand, the wheels are run to the west side of the shop and placed upon spe-

pits at the north end of the plant and the other to those at the south end. At considerable speed the trucks loaded with four wheels are run to the annealing department, where they are shown in Fig. 7. Here the core holes are cleaned out and automatic tongs pick up the wheels, gripping them in the bore of the hub. The four pairs of tongs are suspended from a specially designed Shaw four-hoist electric traveling crane, which, after elevating the wheels above the stone wall surrounding the annealing pits, travels across

the building, depositing the wheels in their proper pits, as shown in Fig. 8.

## THE SPECIAL APPLIANCES USED.

### The Electric Hoists.

Fig. 11 illustrates the high speed I-beam trolley hoist which is so extensively used throughout the plant. It is built by Pawling & Harnischfeger, Milwaukee, Wis., and both the trolley travel and the hoist are operated electrically and controlled by a single lever. The hoist is of 1-ton capacity and runs on the lower flange of an I-beam, two of its four wheels—one on either side—being geared for the trolley drive. The truck bracket and the trolley frame are of one casting, affording great rigidity. The hoist motor and trolley drive motor are attached on opposite sides of the frame, so that they balance one another. The hoisting drum is so hung within the trolley frame that the load on the hook comes directly beneath the center of the wheel base. All gears and pinions are protected by gear cases. The machine is provided with a load brake, motor brake and limit switch. In the drawing A is the motor which gives the trolley travel through the train of gearing *a b c* and *d*, and B is the hoisting motor, which connects with the drum through gears *e*, *f*, *g* and *h*. One of the contact wires for the motors is shown under the upper flange of the I-beam in the side view, and C is the trolley wheel. The other contact is made on the opposite side of the I-beam in a similar manner as shown in the end view at D. The motors are series wound and have four fields, with armatures of the tunnel groove type. To protect against dust the motors are of the inclosed type. A direct current potential of 220 volts is used.

To the lower side of the hoist motor the two reversible and inclosed controllers E and F are attached. The controlling device is in the form of an outrigger, which permits operating the hoist without the operator interfering with the work. One lever controls both the hoisting or lowering and also the trolley travel in either direction. A turn of the controlling bar in a horizontal plane effects the trolley travel through bevel gears and a quill shaft extending to the corresponding controller, while a tilting of the same handle actuates the hoist motor through a rock shaft extending through the quill to the other controller. Both motors can be reversed by simply changing the direction of movement of the bar, and both motors can be operated simultaneously when desired. The controller connections are so arranged that the motion of the operator's hand is in the same direction as the motion of the machine; for instance, the elevation of the right hand end of the handle bar causes the hook to rise.

Fig. 8.—The Special Four-Hoist Shaw Electric Traveling Crane Lowering Four Wheels into the Annealing Pit After Raising Them from the Wheel Trucks. The Tongs Release Automatically After the Wheels Are Lowered.

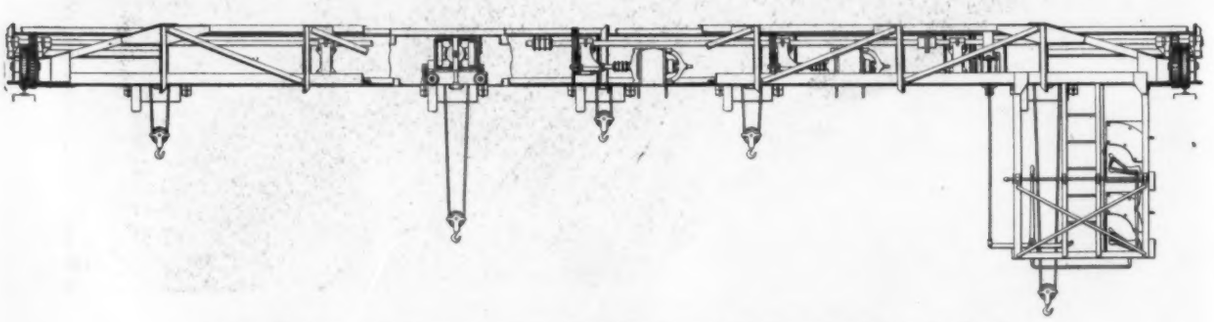


Fig. 9.—Details of the Special Four-Hoist Shaw Electric Traveling Annealing Pit Crane.

The motors are each 2½ horse-power, and the maximum hoist speed is 30 feet per minute for full load and 75 for light load. The maximum trolley travel is 350 feet per minute for full load and 400 for light load.

### The Annealing Pit Crane.

Figs. 8 and 9 show the 2-ton annealing pit crane equipped with four independent hoists. The span of these cranes is 43 feet 3¼ inches, and hight of hoist 20 feet. The hoists are carried on wheels, and may be moved along the

crane to any desirable position, and secured for service. A fifth or spare hoist is provided, which is placed in the center of the bridge. In case of accident to either one of the hoists next to it the disabled one can be moved

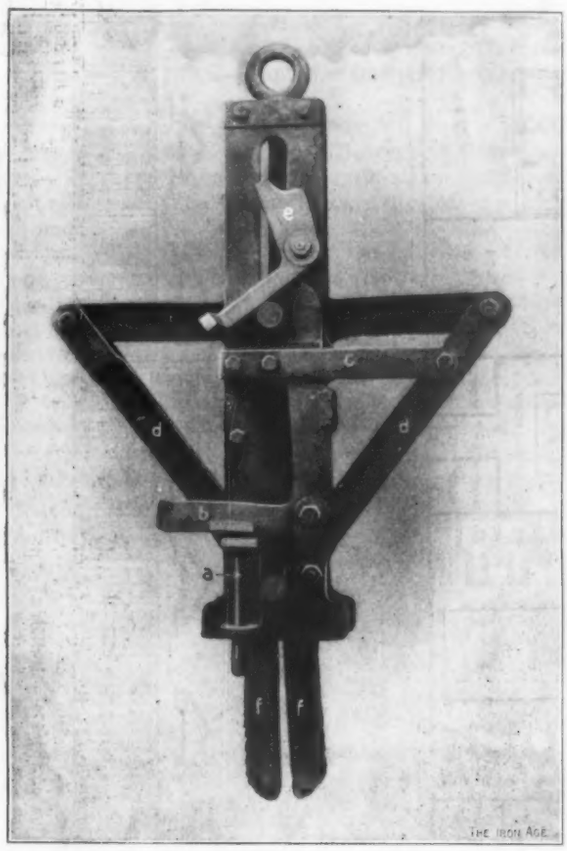



Fig. 10.—The Automatic Tongs Used in Handling the Wheels.

Each crane is provided with two bridge motors, one being held in reserve. In case of accident to either one of the motors, the other one can immediately be switched into the circuit. By moving the bridge motor gear along the driving shaft, throwing it out of mesh with the pinion, or removing the armature extension shaft carrying the pinion, either motor will be at rest while the crane is being operated by the other motor.

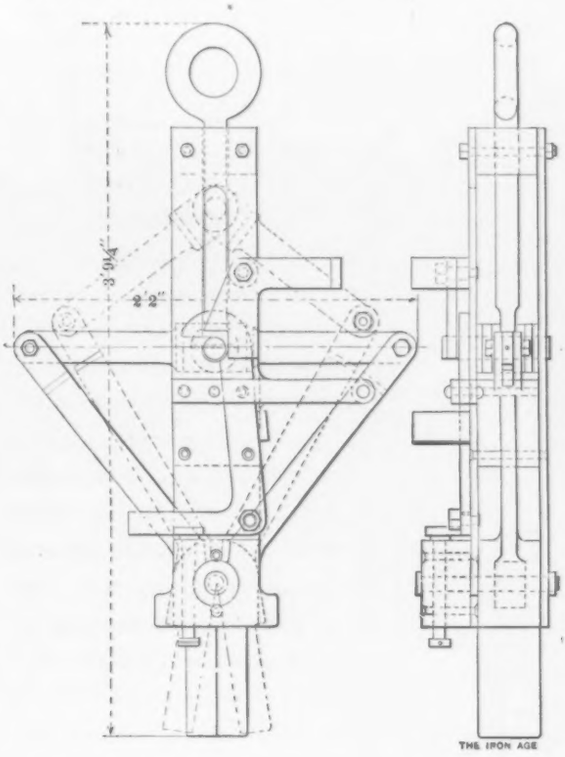



Fig. 12.—Front and Side Elevations of the Automatic Tongs.

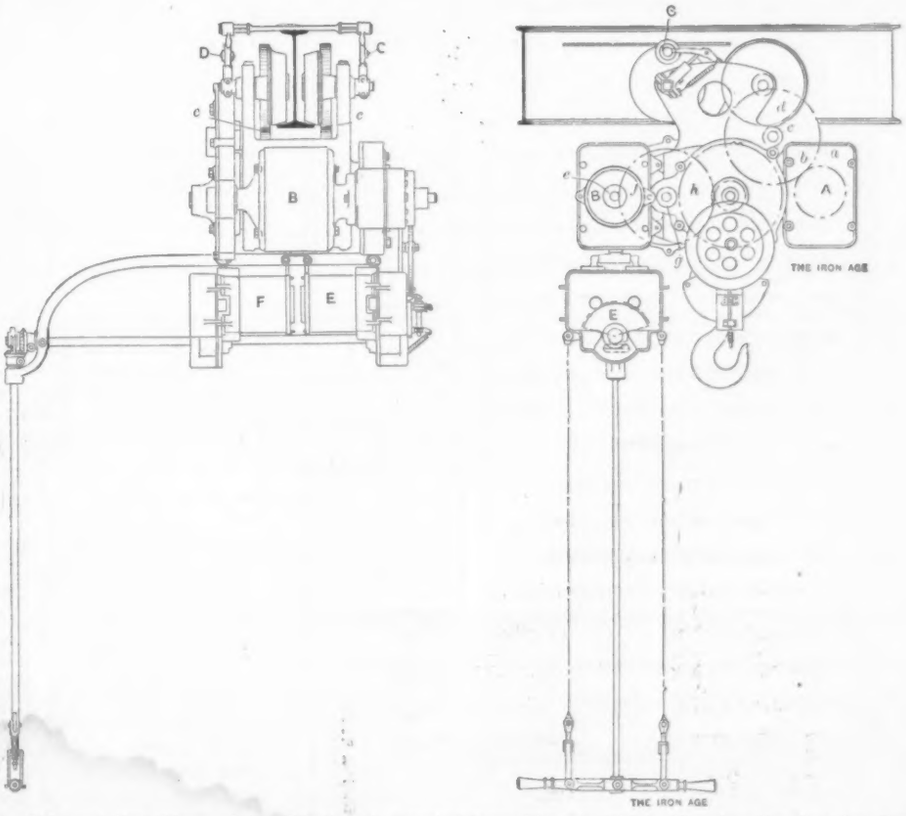
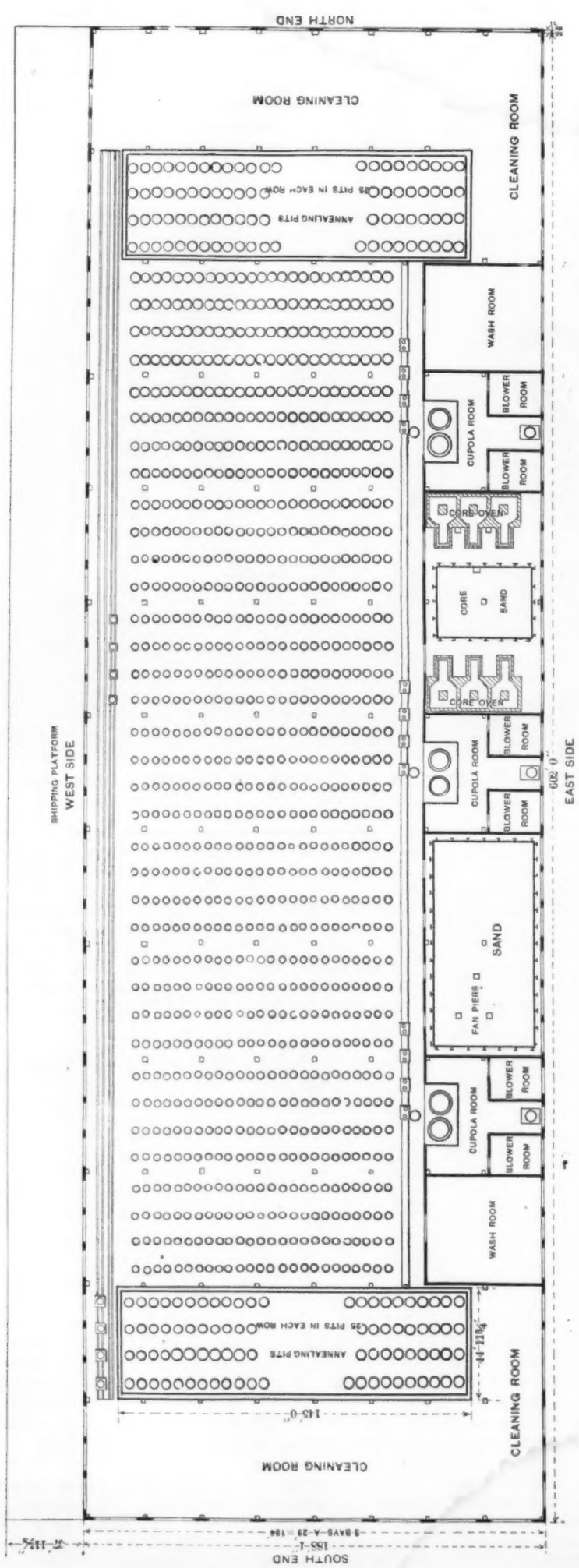



Fig. 11.—Side and End Views of the Pawling & Harnischfeger Electric Hoist, Showing Gearing for the Drive.

sufficiently toward the end of the crane to allow the spare hoist to be put in its place. In case of accident to either one of the end hoists, it can be moved closer to the end of the crane, allowing the one next to it to take its place, and the spare hoist to take the vacant place.

Each crane is also provided with a spare controller, in addition to the five controllers used for operating the five movements of the crane. By means of a special switchboard this controller can be connected up to any one of the seven motors on the crane.



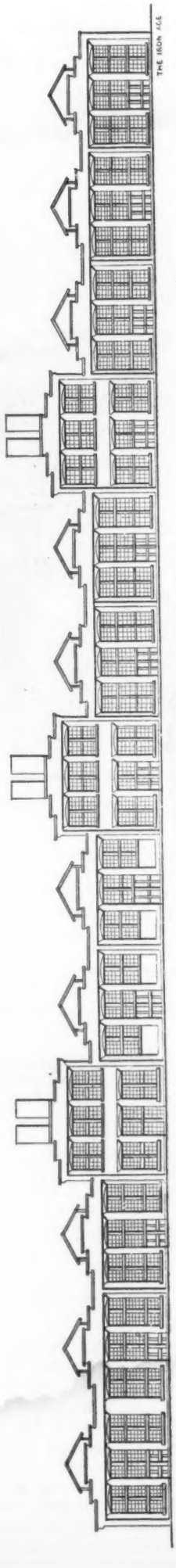



Fig. 13.—Floor Plan and Side Elevation of the Main Building.

Each crane having a spare hoist, controller and bridge motor it can be continually kept in service, avoiding the necessity of laying it up for repairs.

The hoist motors are each 7½ horse-power, giving a speed of hoist of 100 feet per minute with full load and 200 feet per minute without load. The bridge motors are each 10 horse-power, giving a bridge speed of 500 feet per minute with full load and 550 feet per minute without load.

**The Automatic Tongs.**

The problem of picking up and dropping the wheels at the annealing pit without delay is successfully overcome by means of the automatic tongs illustrated in Figs. 10 and 12. As shown in Fig. 10, the tongs are in position to take hold of a wheel. The tongs are lowered so that the toothed pieces *f f* enter the bore of the wheel. As the bottom of the pin *a* touches the hub it raises the horizontal leg of the bell crank *b b*, which action throws the vertical leg to the right until the upper hooked end releases the pin in the center. This draws the arms *d d* together, when a lifting strain is put upon the upper eye of the tongs and forces the projections *f f* apart, clutching the wheel in its bore. The upward movement of the central pin throws over the crank *e* past its center, and it drops by its own weight, leaving the notched leg extending vertically downward. When it is desired to release the wheel it is lowered until it rests on the floor or some other support. Then as the lifting strain is removed the central pin drops to its lowest position and is latched by *e*. The tongs being again raised are prevented from taking hold of the wheel, and as the pin *a* drops back *b* falls with it, the hook on the vertical leg of *b* again engages the pin and the crank *e* is restored to the position shown in Fig. 10, and the tongs are ready to lift another wheel.

In this manner the wheels can be picked up from the wheel cars and deposited into the annealing pits automatically, and again taken out of the pit automatically to be transferred to the cleaning room.

**The Special Trucks.**

The wheel car, which is shown in Figs. 6 and 7, is built up of structural steel, consisting essentially of two 5-inch channels, weighing 6½ pounds per foot, bolted to square axles, and containing on their top in the center two circular steel bands 21½ inches in diameter, the upper one being raised about six inches above the top of the channels. The hot wheel is placed on top of this upper band, simply resting upon it without any special fastenings. The trucks are each about 4 feet long, being 3 feet 6 inches between centers of wheels. The wheels are 15 inches in diameter, and the truck is operated upon 20-pound rails laid on the C. W. system. The gauge of track is 2 feet 7½ inches. The four trucks are connected by means of square steel rods, and the fastenings of the endless operating cable are on the first and last cars.

The ladle cars, shown in Fig. 2, are built up of structural steel. Two 6-inch channels, weighing 8 pounds per foot and about 7 feet long, are suspended underneath the two axles by means of yoke fastenings. Resting in the center upon these channels is a steel pan 4 feet 10⅞ inches long and 3 feet 10⅞ inches wide, built up of ⅜-inch plate and having rounded corners. The wheels are 15 inches in diameter, and, as in the case of the wheel trucks, run on 20-pound rails placed at 2 feet 7½ inches gauge. These trucks are connected in a similar manner to the wheel trucks and are operated on the same principle.

**The Pouring Reservoir and Ladles.**

The steel reservoir, which receives the molten metal direct from the cupolas, is built up of ⅜-inch plates and 2 x 2 x ¼ inch angle iron. The reservoir has a capacity of about 7 tons. It is 4 feet 5 inches wide in the center and 33 inches high above the center bearing and extends 30 inches below the center bearing. The opening for pouring the metal in the front is 4 x 5 inches, tapering almost to a point on the bottom. The reservoir is tilted by means of hydraulic pressure, the cylinder, located directly underneath, having a double piston arrangement, moves the chains attached to the disks on the ends of the side bearing pins. The reservoir was made in one of the shops of the Pennsylvania Railroad at Altoona.

The ladles are made of 5-16-inch plates, being 22⅜ inches wide, inside diameter, and about 18 inches deep. They are each of just the proper size to hold sufficient metal for the casting of one wheel.

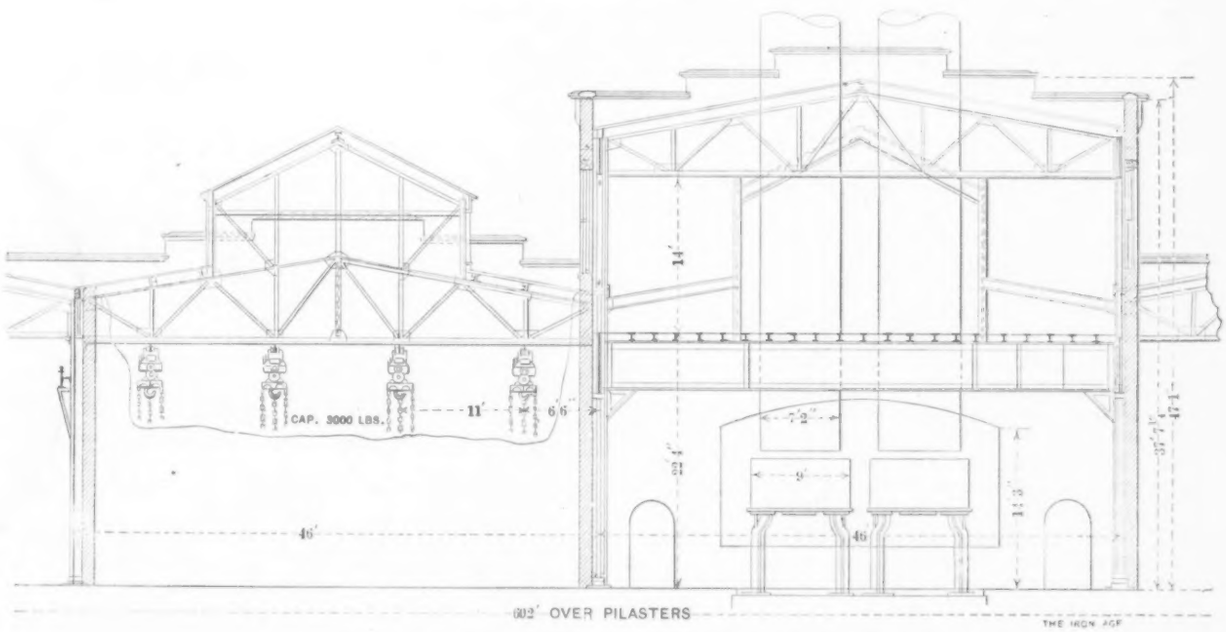



Fig. 14.—Part Longitudinal Section, Showing Typical Features of Construction.

## SPECIAL FEATURES OF THE PLANT.

As will be noted by reference to Fig. 13, the main foundry building is 602 feet long by 188 feet wide. On the west side a shipping platform about 38 feet wide runs the entire length of the building. This is elevated to a level with the foundry floor, and the railroad tracks are depressed at that point, so that the floor of the cars comes flush with the shipping platform. This platform is used for the storage of wheels prior to shipment.

The cleaning rooms, at each end of the building, it will be seen, are large enough to permit of easily handling the full capacity of the annealing pits. The annealing pits at each end of the building, it will be observed, are arranged in four rows, carrying out the principle of handling the wheels by fours. There are 25 pits in each row and each pit has a capacity of 20 wheels.

At each end of the building a washroom is located.

These are fitted out in excellent manner, being equipped with enameled iron wash basins having nickeled fixtures, shower baths, metal lockers and all modern appurtenances.

There is one core department, consisting of six ovens, to take care of the entire plant. Three of the ovens are located on each side of the core sand pit. The novel construction of the ovens permits of an enormous capacity for each oven. The entire department is about 92 feet long and 40 feet wide. About one-third of this space is given to the sand pit. The ovens are about 11 feet wide and each has a pit 7 feet long by 3 feet 8 inches wide and 4 feet 9 inches deep, immediately in front of the fire doors. The grate is 4 feet deep and is elevated 14 inches, leaving a space 3 feet high for the fire. On a foundation about 3 feet square, in the center of the oven, a central spindle containing circular revolving shelves is mounted. This is so constructed that each of the shelves can be rotated independently. The shelves are made up of cast iron segments bolted together and to a centerpiece. Upon these segments perforated plates of 3-16-inch tank plate are laid. The shelves are 10 feet 6 inches in diameter and 2¼ inches thick. There are 7 rings, or shelves, to each oven. Each one will hold 41 ring cores, making a total capacity for one oven of 287 cores. The ovens are fired by means of coke. Details of one of the ovens are shown in the engraving Fig. 16. A plan view of three ovens, showing the flues and similar features of construction, is given in Fig. 17.

An interesting feature of these ovens is the construction of the doors. There are two doors to each oven.

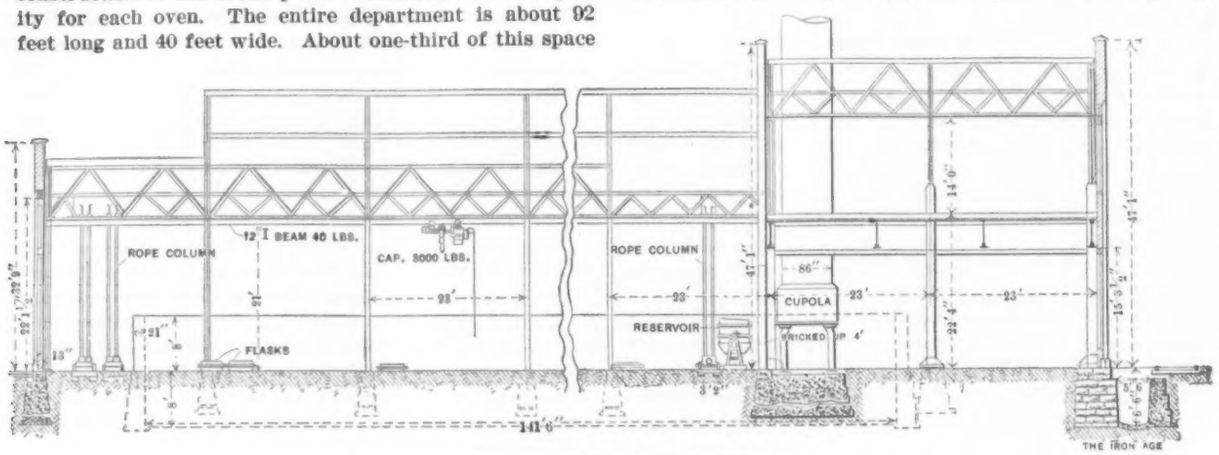



Fig. 15.—Broken Cross Section.

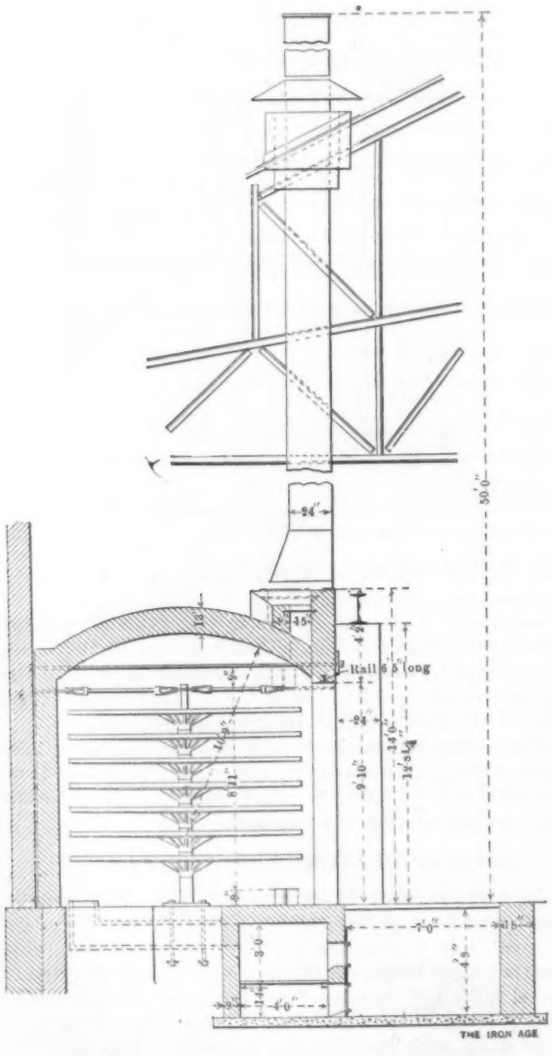



Fig. 16.—Section of One of the Core Ovens.

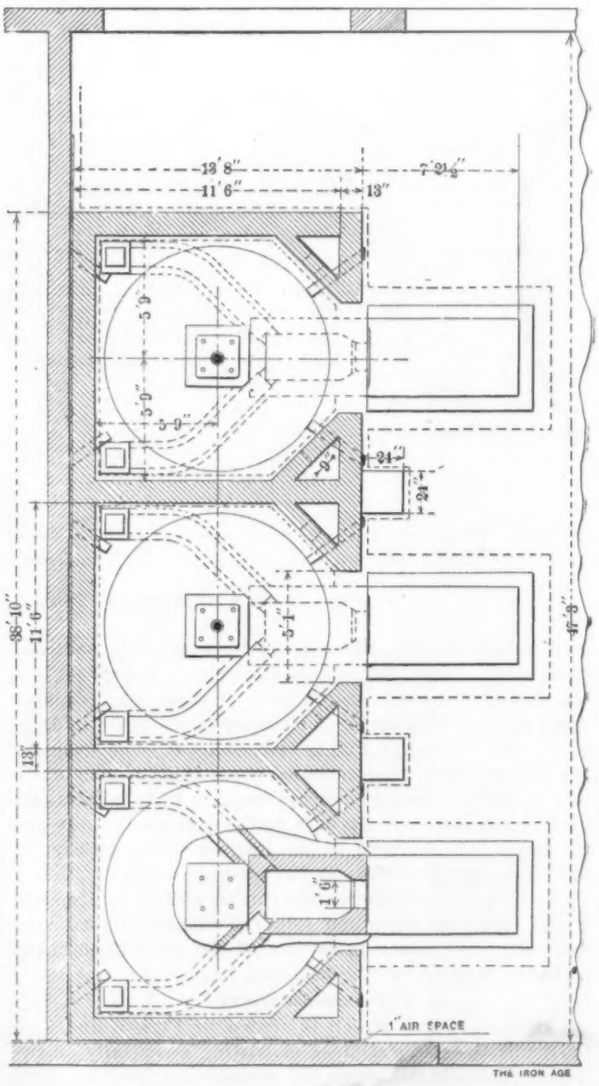



Fig. 17.—Plan of Core Ovens.

They are hinged to the side and are opened and bolted by means of a hand wheel located on the left hand side of the right hand door. The turning of this wheel lowers the upper and raises the lower bolts, which engage in a vertical position. The doors are made of 3-16-inch tank steel, ½ inch asbestos and No. 16 sheet iron, bolted together with carriage bolts.

The system of charging the cupolas possesses several features of interest. In the first place, the charge is selected in the yards and the trucks are properly loaded before they are brought up to the charging floor. The truck is then simply emptied upon the coke as it comes to the cupola. Running up to the charging floor is a hydraulic elevator which contains on its platform a turntable and narrow gauge tracks. On the charging floor the tracks branch off V-shape to either of the cupolas. In the yard the tracks lead to the scale house, where the charging materials are stored in bins. Directly outside of this house is the wheel breaker, which consists simply of a steel cupped base, on which the old wheels to be broken are placed and a tower and elevating mechanism for raising the ball prior to the drop. Within easy reach the coke and pig iron are also stored.

The empty trucks are wheeled on the scale and loaded

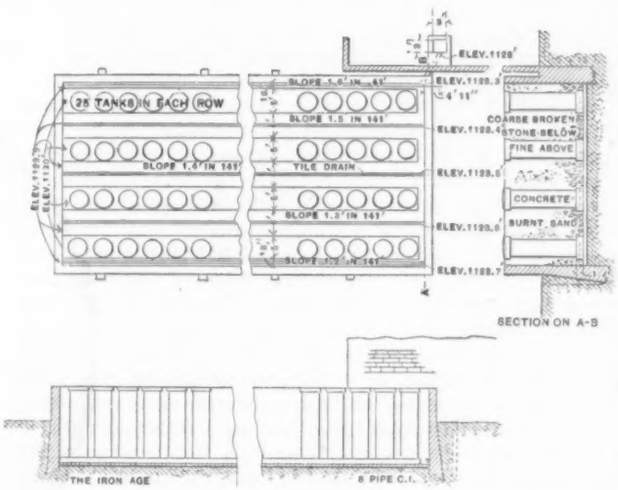



Fig. 18.—Broken Plan and Sections of the Annealing Pits.

with the proper charge, which is about as follows:

10 per cent. coke iron.
30 per cent. charcoal iron.
5 per cent. steel scrap.
55 per cent. old wheels.

Each truck holds 2 tons, and for each coaling two cars of the metal are thrown on top of 9 tons of coke.

There is a complete charging outfit of this description for each of the three pairs of cupolas. The six cupolas are of the Paxson-Colliau type, each having a capacity of 12 tons per hour. Sirocco cupola blowers, made according to special specifications as to materials used, are employed.

The heating and ventilating apparatus was installed by the B. F. Sturtevant Company of Hyde Park, Mass. The installation consists of two apparatus, each comprising a 10-foot fan wheel in steel plate housing, supported upon a raised platform with a portion of the housing extending beneath. Each fan is driven by a multipolar motor wound for 165 revolutions per minute at 220 volts, and draws the air through a heater containing 12,000 lineal feet of 1-inch pipe built up in sections and inclosed in a steel plate jacket. All of the piping is carried overhead and the air is forced downward and delivered near the floor level. With this arrangement the utmost economy of heat is secured, due to the fact that there is no over heating of the upper portions of the building. The amount of window space shown in the side elevation, Fig. 13, obviates any necessity for dwelling on the fact that the excellent light is one of the many admirable features of the plant.

A cruising gasoline motor boat now being built in London is 65 feet long, and with 340 horse-power develops a speed of 20 miles per hour. There are three screws, of which the two outer are actuated by gas engines of 150 horse-power each and drive the boat at the maximum speed. The central screw is operated by an engine of 40 horse-power and is used mainly for cruising at low speeds, though it may also be used as an auxiliary to the others when the maximum power is required. This central screw is much used also in maneuvering the boat. Accommodations are provided for six passengers and a crew of two men. One provision of the contract requires that the boat shall cross the Atlantic under its own power, which it is expected will be accomplished in about seven days. Fuel accommodation is provided for a radius of ten days at full speed, or a distance of 4800 miles.

## Alcohol Carburetors and Motors in France.

It is reported by Robert P. Skinner, United States Consul General at Marseilles, France, that in spite of official encouragement alcohol motors and carburetors may be said to remain incompletely developed. While many manufacturers have their particular form of carburetor, there is one device which is in greatest demand. Yet even of this type, out of 60,000 carburetors sold only 500 were intended for the consumption of pure alcohol, all the others being for gasoline or carbureted alcohol. The sale of alcohol motors has been equally unimportant. Probably 100 petroleum or gas motors are sold to 1 alcohol motor, on account of the high cost of alcohol, the greater consumption per horse-power hour than of either petroleum or gas and the difficulty arising from oxidation.

The alcohol carburetor referred to is manufactured for motors of from 4 horse-power upward. It operates on the same principle as the carburetor for gasoline and as regularly, but differs in that the reheating system is more intense. In their application to motors their advantages and disadvantages are thus described: Additional suppleness in movement, but increased consumption as compared with gasoline; initial heating of carburetor necessary; possible oxidation of plugs, pistons and piston rings, unless care be taken to run the motor with gasoline during the last moments of use. The motors operating with alcohol are used both for stationary and automobile service. Those of the first class are generally gas motors transformed by the simple addition of a carburetor and by some modifications of detail. The automobile motors are the same as those designed for the consumption of gasoline with another form of carburetor.

In a new method lately tried the alcohol is forced at a desired temperature through a vaporizer in a quantity accurately proportioned to meet the machine's momentary need. At the last public competitions for a 6 horse-power motor the consumption was 410 grams per horse-power hour, as against 578 grams with the carburetor above referred to.

Paul Barbier, president of the Technical Society of the Alcohol Industry, states that the use of alcohol at the same price as petroleum, and even at a slightly greater price, is more economical, since carburization of the alcohol when well done permits more complete utilization of calorific power than in the case of the petroleum products. He adds that all motors operating on the explosion principle may be fed with alcohol if the construction of the explosion chamber is modified. Injection carburetors and those operating upon the principle of vaporization and circulation give good results.

The Minister of Agriculture prepared a report upon the competitions organized by his department in 1901-1902, which contains considerable information on this subject. Nearly all manufacturers have fully realized that owing to the different properties of gasoline and alcohol the use of the latter liquid, if rendered not only possible but practicable, would offer certain real advantages in numerous cases, as, for example, in the merchant and military marine, where the use of gasoline is out of the question because of its danger. They have not worked out any system as yet, however, which seems to respond adequately to the various requirements.

# The Sheet and Tin Plate Industries.

BY B. E. V. LUTY, PITTSBURGH, PA.

The increase in the production and consumption of sheets and tin plates in the United States has been so much greater than the increase in iron and steel products generally that the cognate industries of sheet and tin plate manufacture warrant special mention. One must go back fewer years with sheets and tin plates to find a time when production was one-half of the present than is necessary with pig iron. Unfortunately statistics of the sheet industry are entirely lacking, but sufficiently close estimates have been made from time to time to warrant speaking with confidence. The statistical feature of the case can be approached in another way. It is a matter of record that the total production of all plates and sheets, excluding nail plate, averaged in 1897 and 1898 1,300,000 gross tons, which increased in 1903 to 2,600,000 gross tons. It is a matter of fairly close approximation that in each case the tonnage of tin plates and of sheets No. 20 gauge and lighter constituted about 40 per cent. of the total. That the light material has kept pace with the heavy is extremely significant. The lines of employment of plates in 1897 and 1898 have had a healthy growth; still, it was no trick for the light material to keep pace with them. But to the uses of plates in vogue in the earlier years there has been added, wholly in the past half dozen years, the magnificent steel car industry, which, for all-steel and steel underframed cars, has a normal appetite for well over 500,000 tons annually of plates. Then, again, the proportion of plates entering into structural work has greatly increased. The earlier demands for heavier and heavier structures were met by increasing beam and channel sections, but later the further demands had to be met by girders and columns built up of plates. With such a hardy competitor, involving heavy tonnages in each new use, it is submitted that sheets and tin plates have done very well in keeping pace.

That the sheet and tin plate industries now represent a tonnage of something like 1,000,000 tons a year is certainly remarkable, in view of their extreme lightness, as compared with other tonnage producers, such as plates, shapes and rails. The production of some 500,000 tons of tin plate in 1904 represents an area of between 50,000 and 60,000 acres, or not far from 100 square miles, enough to put a roof 75 or 100 feet wide on all the new railroads built in the country in a year. With a comparable tonnage the area of black and galvanized sheets is not greatly less.

Indulgence in these popular similes may be pardoned on the ground that the magnitude of the sheet and tin plate industries can hardly be set forth in any other way. It is idle to attempt to chronicle the uses to which these materials are put, and if the impossible could be accomplished of cataloguing the uses involving material tonnages the catalogue would become incomplete within a week. Tin cigar boxes are promised, and a fortnight ago *The Iron Age* noted that a plant was to be erected at once able to make 150 bathtubs a day, each tub to be stamped out of a single steel sheet by a new process.

### The Demand and Supply.

In 1902, when the demand for steel products generally was so great that heavy imports were made of pig iron and crude steel and the general trend of prices was upward through more than half the year, sheets and tin plates were comparatively weak, the former declining slightly in price in the spring and both declining heavily in the late summer and fall. The reason was obvious to all—there was an evident excess of producing capacity, and the fact was frequently commented upon at the time. This review of a year ago pointed out that the feature of the movement in 1903 was that relatively competition in sheets was greater than in tin plates, resulting in an increase in the price spread, tin plates above sheets, but did not find occasion to regard competition in tin plate as sharper than in other branches of the iron and steel industry. In surveying the ground another year later, no reason is found for considering that the stress of competition, greatly increased with other lines as compared with immediately preceding years, has borne more heavily on either the sheet or the tin plate industry than it has on such other lines. It is true that prices have been forced to a rather low level, but the fact remains that the fairly well positioned producers have been pretty active and have at nearly all times been able to do a little better than make both ends meet. From being a comparatively unsatisfactory branch of a generally satisfactory industry in 1902, the sheet and tin plate trades became in 1904 a comparatively satisfactory branch of a generally unsatisfactory industry.

This has been due to the large relative increase in consumptive demand. From 1902 to 1904 the production of tin plate has increased by more than 40 per cent. and of sheets by almost as much, while the production of pig iron has decreased perhaps 8 per cent.

### The Comparative Capacity.

The following table indicates approximately the changes in actual operative capacity during the year, the figures referring to the total number of hot mills:

| | Sheets. | | Tin plates. | |
|---|---|---|---|---|
| | 1903. | 1904. | 1903. | 1904. |
| Steel Corporation | 164 | 163 | 264 | 248 |
| Independent | 136 | 173 | 71 | 83 |
| Totals | 300 | 336 | 335 | 331 |

The number of mills at the end of 1903 covers only completed mills. Substantially all the increase shown at the end of 1904 has been due to the completion of mills in course of construction at the beginning of the year. In the cases of both the Steel Corporation and the independents no mills are included in the table except such as are actually operative. No unfinished mills, mills lacking adequate working capital or mills not now in a position to operate are included. Such will be referred to later. At the close of the year substantially all the Steel Corporation mills are in operation. The total of 163 sheet mills credited to the corporation includes eight jobbing and two light plate mills. The total of 248 tin plate mills for the corporation is merely representative, the actual number of hot mills having been increased by six to represent the added capacity of the eight finishing mills at the Monongahela works arising from the continuous mill adjunct of this plant. Of the independent mills represented in the totals in the table all are in actual operation at the close of the year or are idle from purely temporary causes.

In addition to the mills represented in the table there is a little sheet capacity and a great deal of tin plate capacity which is idle from being incomplete or from being involved in financial difficulties of one sort or another. Neglecting the projects at Pueblo, there are embraced in this category five tin plate plants, containing about 27 tin mills, at Morgantown, W. Va.; Marietta, Ohio; Clarksburg, W. Va.; Greencastle, Ind., and Atlanta, Ind. It is very likely that some of these will be financed and put in operation in the not distant future.

The Steel Corporation is not increasing its tin plate capacity. Its sheet capacity will be augmented about April 1 by the Bray semicontinuous mill at Sharon, which is not represented at all in the table.

### The Price Movement.

In sheets the year opened with No. 28 gauge at 2.35 cents. With a steady decline, broken only by a slight hardening in February, the price fell to 2.10 cents by the beginning of June, and while thereafter some special sales were made at somewhat lower prices, the market remained fairly steady at this level until the official advance was made November 15 to 2.20 cents. The market has become still stronger since then.

In tin plate the dates of the official price changes have been as follows:

| | |
|---|---|
| November 16, 1903 | $3.60 |
| January 25, 1904 | 3.45 |
| July 25, 1904 | 3.30 |
| November 15, 1904 | 3.45 |

The prices are for 100-pound coke bright plates, f.o.b. Pittsburgh, subject to 5 cents a box rebate. Terms were 30 days less 1 per cent. for cash in 10 days until July 25, when the cash discount was increased to 2 per cent.

**Extension of the Bray Process.**

A year ago this review referred to the year 1903 as marking the distinguishing development of a partly automatic process of rolling having been made a commercial success in tin plate manufacture. As the sheet industry is hardly less important than the tin plate industry, the year 1904 comes in for almost equal honors, in that in 1904 a Bray mill for the rolling of sheets has been almost completed. It has not been put in operation, and will not be until about April 1, 1905, but that it will be a success is a foregone conclusion. The success at the Monongahela works in rolling black plate more than guarantees success at Sharon in rolling sheets, because sheet orders call for heavier gauges than tin plate, and because oxidation need not be so carefully guarded against.

In one respect the Sharon mill will be a more striking development than the Monongahela mill, inasmuch as all the Monongahela product, for tin plate purposes, requires finishing by hand, with two heatings, except for the crosses, which take one, while at Sharon sheets of No. 22 gauge and heavier will be turned out direct from the Bray mill, without any finishing by hand at all.

In general arrangement the Sharon mill is quite similar to the Monongahela mill, the chief difference being that it will have one additional stand of rolls in both the continuous roughing and the continuous finishing mill, there being, on the other hand, only five hand finishing stands in place of eight. The equipment is as follows:

1. Continuous heating furnace.
2. Continuous roughing mill of six stands, with tables.
3. Automatic matcher.
4. Continuous mill of three stands, with tables.
5. Automatic doubler.

The automatic matcher is adapted to match any number of bars that may be desired, so that heavy sheets can be finished direct from the mill, matched in three or in four. This will be done on No. 22 gauge and heavier. The lighter gauges will be doubled in fours and sixes, according to gauge, and finished by hand, at one heating, No. 24 gauge requiring but one pass.

As the Monongahela mill is easily ratable at 100 gross tons of product in 24 hours, it will be seen the Sharon mill will be able to turn out from 100 to 200 tons in 24 hours, according to the run of orders. The reduction in wage cost at Sharon will be considerably greater than at the Monongahela works, on account of the reduced amount of finishing involved. A tonnage scale is in force at the Monongahela works, with a guaranteed minimum, and the same principle will be followed at Sharon.

The Sharon mill is an adaptation from the sheet mill practically completed by the Sharon Sheet Steel Company, a subsidiary of the Sharon Steel Company, which was consolidated with the Union Steel Company, and at the close of 1902 passed to the United States Steel Corporation. Some of the machinery then installed has been utilized, and some machinery was brought from the Champion tin mill at Muskegon, Mich., which the corporation dismantled.

The Sharon mill is designed under the same patents as the Monongahela mill, issued to C. W. Bray, chief engineer and first vice-president of the American Sheet & Tin Plate Company, assignor to the company.

**Wage Matters.**

The general reduction in the sheet and tin plate wage scales authorized by the Amalgamated Association in the spring of 1904 was almost unprecedented. At the insistence of the independent sheet manufacturers in the latter part of 1903 a reduction of 10 per cent. in the sheet scale was made effective on January 1, 1904. The basis for this reduction was that the leading interest had a large number of nonunion sheet mills, at which wages had a short time before been reduced so that they were 20 per cent. below the Amalgamated scale as signed for the year ending June 30, 1904. Early in the year the American Sheet & Tin Plate Company became convinced that at some independent sheet and tin mills the regular Amalgamated Association scale was not being lived up to, while in its own mills the scale was being quite closely followed. After a careful investigation the company on March 15 formally notified the national officers of the Amalgamated Association that the scale was being generally violated in independent mills, and called upon it to enforce the fourth division of the scale as signed, which requires that if evidence is produced that there are deviations from the scale at any point, every effort shall be made to stop them, and in case of failure all other similar mills shall be given the same benefit. The deviations included rolling material to gauges lighter than were being paid for, the systematic charging of men with broken rolls, the payment for tonnages smaller than actually rolled, and other and quite ingenious means of permitting the labor cost to be lower than the scale called for. As representative of all such evasions, the company called for a reduction of 20 per cent. in the tin plate scale, and a further 10 per cent. in the sheet scale, making a total of 20 per cent. in the sheet scale. The general Advisory Board of the workers' organization was summoned to Pittsburgh by wire, and after strenuous deliberation granted the claim, effective from March 21 to April 2. Voting sheets were sent out to the sublodges for a ratification of the concession, but rather to the chagrin of the board the lodges refused to ratify. A return to the former wages being refused by the manufacturers, the case really called for the officials to declare a strike, but by an absolutely necessary expansion of their authority the officials solved the dilemma by calling an "expanded conference" of the sheet and tin plate lodges, and meanwhile authorized the men to continue at work. After a very exciting time the "expanded" conference on April 14 agreed to a general reduction 2 per cent. less than had been demanded, the screw boys in tin mills being reduced only 5 per cent. This made a general reduction of 18 per cent. in the sheet and tin plate scales as they had been signed for the scale year, including the 10 per cent. on sheets which had previously been granted. The American Sheet & Tin Plate Company agreed to suspend later the collection of the 3 per cent. on tin plate wages, to provide the 25 per cent. wage concession on rebate tin plate. This collection was accordingly suspended on June 1.

When the Amalgamated Association held its annual convention in Cleveland early in May, there was much opposition to the continuance of the wage reduction, and still more to the continuance of the rebate clause. The collection had been suspended, but there was no definite agreement that it should not be reinstated. The conference committee was instructed to insist upon a reduction of only 10 per cent. from the old scale, thus restoring 8 per cent. of the cut on both sheets and tin plates, and on the total elimination of all rebate arrangements. At midnight on June 30, after much negotiation, the American Sheet & Tin Plate Company signed the scale provisionally, with the same reduction that had been in force, but on such a basis that the whole matter would be reopened if an agreement could not be reached later on the rebate matter. Following this, a number of the independents signed the scale absolutely. Others refused to do so until later. On Saturday, July 23, a compromise was effected on the rebate matter by which 1.5 per cent. was thereafter to be deducted from the men's wages, other conditions remaining unchanged. This action cut in half the amount of money that would be contributed to the fund, and therefore cut in half the quantity of tin plate exported in the form of containers on which the company could collect the 25 per cent. wage rebate. With all the company's union mills running full, the quantity collected can pay the rebate on only about 10,000 boxes per week, or allowing for only the most moderate stoppages on less that 500,000 boxes annually, whereas the rebate trade amounts to from 1,250,000 to 1,500,000 boxes annually. Immediately after the settlement the collection of the rebate money was resumed and has since been continued, but it is not known just how much export business of this nature the company contemplates working for.

In the bare scale of wages there is little difference

between the union and the nonunion mills. The regular nonunion sheet scale is 20 per cent. below the old Amalgamated scale, and therefore approximately 2 per cent. below the present Amalgamated scale. In tin plate the nonunion scale is 25 per cent. below the old Amalgamated scale, and therefore approximately 7 per cent. below the present Amalgamated scale, not considering the rebate feature. At one tin mill, however, a reduction of 28 per cent. has been in force. There are some differences in the general provisions which are to the advantage of the manufacturers in the nonunion mills. At the Bray and Monessen system mills other scales are in force which are still more advantageous.

**The General Outlook.**

The present prospects of the sheet and tin plate industry are very favorable. The leading interest is operating substantially all its sheet and tin mills, while practically all the independents in regular operative condition are running. At the close of 1903 the leading interest was operating the greater number of its tin mills, and started more early in 1904, swelling its production to a very heavy rate, but all through that movement two or three mills now operative were idle. Moreover, the company in that production movement accumulated an enormous stock of tin plate. The actual total was never known, but it was estimated by quite competent authorities at 3,000,000 boxes. It is certain that the workmen believed in the existence of all this stock, or they would not have yielded even the grudging consent they did to the wage reduction. On the production movement recently started, on the other hand, the company has accumulated no stocks, and is in more danger of being behind in its shipments than of finding itself with any stocks on hand. In sheets also the heavy production is being promptly shipped. That all the material being shipped is not going immediately into ultimate consumption is well understood, but that buyers are willing to take it and pay for it is too tangible an evidence of faith in the future to be disregarded.

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In experiments made on a highway with an electric motor car a tractive effort of 42.7 pounds per ton was observed on a dry road at a speed of 10.8 miles per hour. On a very muddy road, at a speed of 9.32 miles per hour, the tractive effort rose to 74 pounds per ton. The resistance on a dry road would thus appear to be some 40 per cent. less than on one which is very muddy.

# The Manufacture of Chain.

BY L. B. POWELL.

One of the most important and interesting industries of this country is the manufacture of chain, yet it is one of the least known of all the branches that ackowledge dependence upon our greatest industry, iron and steel. History tells us that almost identical with the discovery of the latent possibilities of iron came its use in the form of rough links, round as rings at first but gradually assuming the oval shape familiar to us to-day.

Chain is easily one of the most staple of iron and steel products, and wherever there are railroads, ships, foundries, lumber regions, new construction, &c., we find chain is a most important item. It is indispensable alike to the farmer, the mechanic, the builder and the sailor. In this age of progress and invention, with new processes of manufacture replacing the old almost daily, it is interesting to note that, barring the innovations for increased output and higher quality, chain is made to-day in practically the same method as years ago by the most primitive artisan. The reason for this is that there never can be invented any machine that will form and weld a link of chain without the active aid and supervision of a skilled workman.

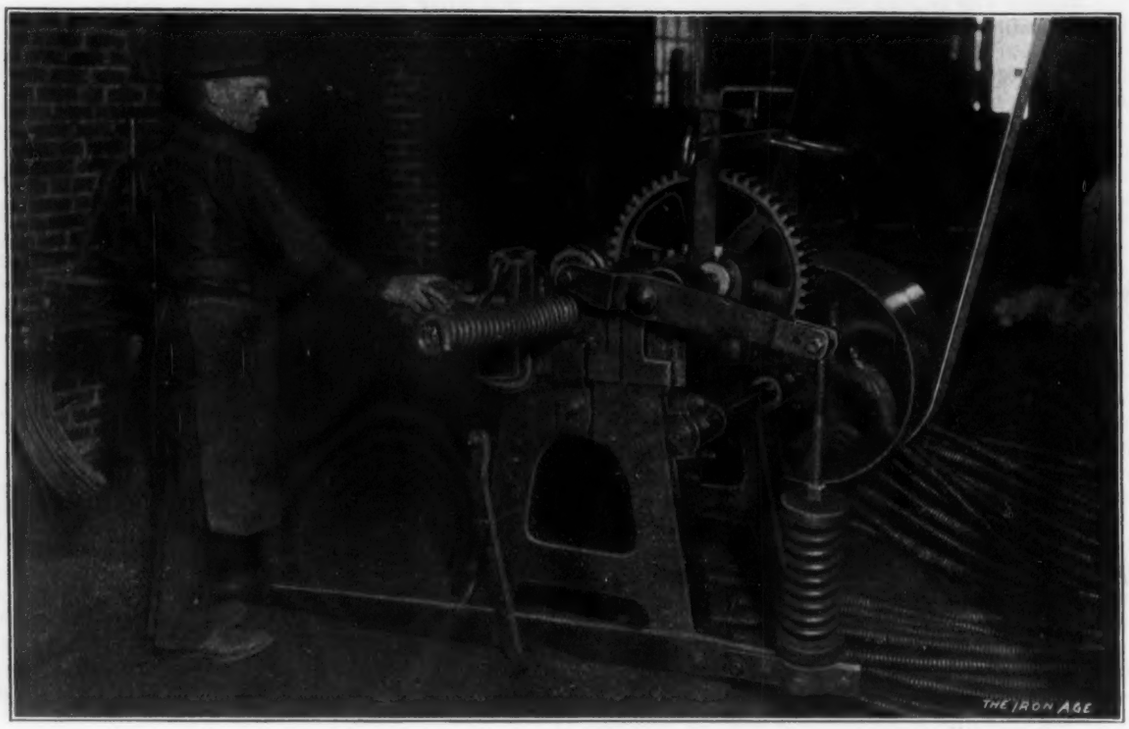


Fig 1.—Winding the Stock Into a Spiral.

There are to-day in this country at least 20 large, well equipped modern chain factories, with an average yearly productive capacity of 2200 tons of finished chain apiece, besides about 10 smaller factories whose yearly capacity will average 600 tons each, so that it can be safely said that we produce, for our own consumption, some 50,000 tons of chain per year. Comparatively speaking, a very small proportion of our chain product is exported, while practically no chain at all is imported into this country. There is no chain manufactured in Canada, but with a duty against us of 30 per cent on 3-16 and ¼ inch chain, and 5 per cent. on all other sizes, and a discrimination of 25 per cent. in favor of England, chain is brought there from England and sold cheaper than our product can be sold.

The manufacture of chain is primarily divided into two distinct classes—namely, hand made and machine made. The main distinction between the two classes is that chain coming under the first head is formed and welded by hand and finished by blows of hand hammers, while that coming under the latter head is wound into

shape by machinery, cut into links by the same power and welded by means of dies operated by power driven hammers.

**Machine Made Chain.**

This class of chain, which covers sizes ranging from 3-16 to 1¼ inches, inclusive, is the cheapest grade of chain that can be made. It is made from open hearth steel in sizes from 3-16 inch to 9-16 inch, and from ⅝ inch up is made from a common grade of iron. The steel arrives at the plant in bundles made by coiling a long rod into a bundle to facilitate handling. The iron arrives in long bars. As the operation of winding coiled rods and iron bars is practically the same, the winding of a bundle of coiled rods will be here described.

*Winding the Links.*—The bundle of rods is placed on a horizontal spool from which it can be wound, is well oiled to insure easy winding, and one end of the rod is fastened in the mandrel of the link winder, near which the spool is placed. A link winder, Fig. 1, consists of a horizontal shaft about 4 feet long, driven by a belt and pulley attached at one end, while on the other end of the shaft is attached the mandrel, which varies in size with that of the link to be wound, the outside dimensions of the mandrel conforming with the inside dimensions of the required link. Directly over this mandrel, and pressed tightly thereon by a powerful spring, is a steel guide wheel, grooved to carry the wire. The wire is fastened over and around the mandrel, the machinery started and the tight pressure of the guide wheel on the wire as it is wound makes the wire assume the shape of a spiral of links. When this spiral has reached the proper length, about 6 feet, the winder is stopped, the spiral cut from the rest of the coil and turned over to the link cutters to be cut into links.

In a factory of, say, 60 fires, with an average production of about 150 tons of finished material per month, the winding and cutting equipment should consist of about five link winders and six link cutters, the latter ranging from the small cutter for small sized links, cutting at a rate of two links every second, to the largest size cutters, capable of cutting 1¼-inch round iron at a rate of one cut every second.

*Cutting the Links.*—The link cutters are of the ordinary type of cutter, consisting of the usual fixed blade at the base of the cutter and the movable upper blade, sliding up and down in a fixed groove and operated by pulley and belt, Fig. 2. The spirals are fed into the cutter from the left side and are held in such a manner that the stock is cut at an angle of 60 degrees with the diameter of the rod, each cut releasing one link from the spiral, the ends of which are cut in the form of a scarf, so that if the link was now closed the scarfed ends would close together in such a manner as to form a complete link. The links are now ready for the chain maker and are wheeled in boxes to each chain fire, where they are placed in a convenient position for handling.

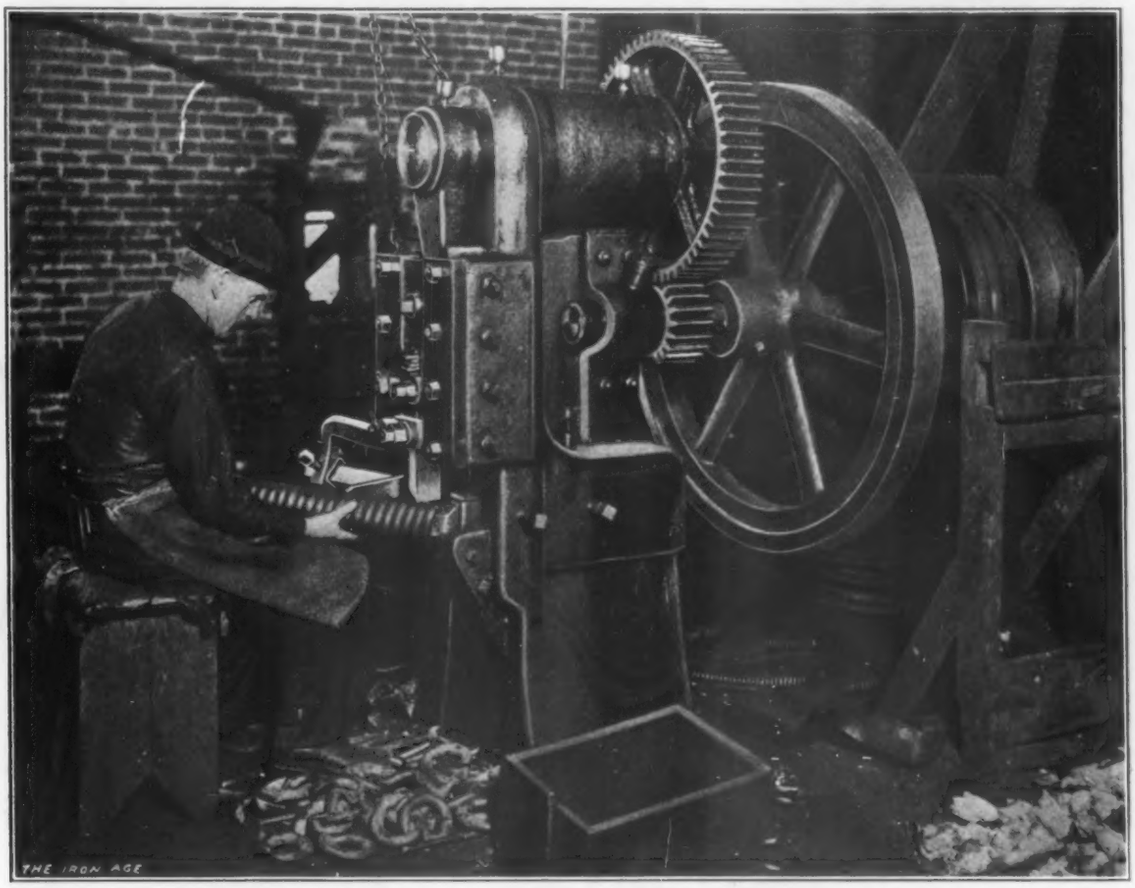


Fig. 2.—Cutting the Spiral Into Links.

The welding of chain is now accomplished on both coke and gas fires, the latter being comparatively recent in use.

*Gas Welding.*—This work is performed at an iron forge, lined with fire brick and with a top of fire brick, in which about 10 holes are made, each just large enough to enable a link to be hung into it. Chain making on gas forges requires the use of a heater boy, who selects the links from the box and hangs them on short hooks, which are laid on top of the forge in such a manner that the link hangs in one of the holes in the top. Gas and air being blown into the forge in the proper quantities and at a high pressure and ignited, the heat emerges through the holes in the fire tops, thus bringing the links to the required welding heat. The links are thus placed at successive intervals, so that while one link is being welded another is being heated and so on.

The chain maker, Fig. 3, holding in his right hand a short pair of tongs, grasps with his left hand the hook holding the link that has reached the proper welding heat. Lifting it out of the fire, he seizes the link with the tongs and hooks the open end of the link through the link last welded. The open end of the link is now placed

over the lower die of the power hammer, and a pressure of the foot releases the arm carrying the upper die, which descends heavily on the link, the impact of the blows welding the link together at this point. Between the successive strokes of the hammer arm the link is being turned over and back and lightly tapped with a hand hammer held in the left hand of the chain maker, thus giving the material the proper working requisite to obtain a perfect weld. These operations are performed with surprising rapidity by experienced workmen, which is necessitated by the fact that links are constantly being brought to the welding heat and a second's delay will result in a burnt and wasted link. On the smaller sizes of chain anywhere from 10 to 15 links will be welded in one minute.

*Coke Welding.*—This is the old fashioned and more reliable method of welding chain, and is shown in Fig. 4. No heater boy is required, a coke fire being too small to hold more links than can be handled by the chain maker alone. Coke fire welding insures a more uniform heat and also lessens the possibility of burning the links. The chain maker places as many links as desired in the glowing bed of coke and, as fast as one reaches the welding heat seizes it with his tongs and welds it in the manner before described. The estimated waste in welding on coke fires is 10 per cent. while that on gas fires is

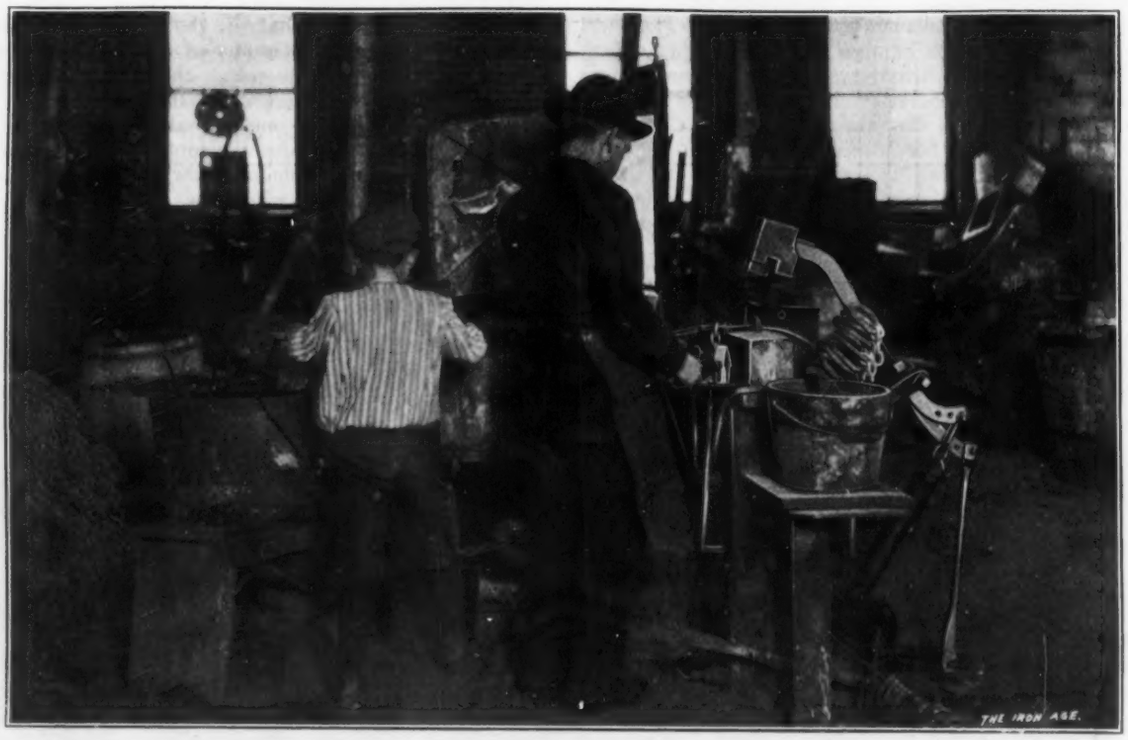


Fig. 3.—Gas Fire Welding.—Heating and Welding 15 Links Per Minute.

Fig. 4.—Coke Fire Welding.—Finishing the Welded Link with the Hammer Arm and the Hand Hammer.

from 6 to 7 per cent. For the very cheap grades of chain the saving in fuel and the increased output resulting from gas fire welding make that process the most desirable, but for better grades of chain we find coke fire welding almost entirely used.

**Hand Made Chain.**

This class of chain is sometimes known as "off the rod" chain, from the fact that the iron for the link is cut from the rod and bent into shape at the fire instead of being cut and wound into shape by machinery. It is also called dolly chain from the fact that, after the weld is made, it is smoothed and finished by means of hammer blows on the dolly, which may be seen in Fig. 6 projecting over the top of the anvil and resting on the upper part of the link.

Hand made chain, in sizes up to ⅞ inch inclusive, is made by the single chain maker alone. From ⅞ inch up to 1⅛ inches, inclusive, the chain maker is assisted by one helper; from 1¼ to 1⅞ inches, inclusive, he has two helpers, and above that size three are necessary. The duties of the helpers are to attend the fire, bend the links into shape and assist in the welding and finishing of the links. In sizes up to and including ⅞ inch the chain maker uses a kicker, which is a dolly hinged on the back of his anvil and with a treadle, so that it can be operated by the pressure of his foot on the treadle. This dolly is used after the link has been welded and is for the purpose of smoothing the welded portion of the link, which would show the marks of the hammer blows were it not smoothed by the dolly.

Fig. 5.—Making a ¾-Inch "Dolly" or Hand Made Chain, the Welded Link Being Finished by Blows of the Dolly Operated by a Treadle.

In making ¾-inch hand made chain, as shown in Fig. 5, the chain maker has in his fire several pieces of iron of the length for a link. When one has reached the proper heat he seizes it in his tongs and, placing one end in a hole in the anvil, bends it around into the shape of a link. It is then placed back in the fire for another heat, and in the meantime another link is being bent, and so on. When the link has again reached the proper heat it is withdrawn, placed flat on the anvil and the ends pounded out with the hammer, so that when the link is bent entirely together these ends will lap over each other and form a closed link. The link is now hooked through the link last welded, the ends bent so that they lap each other, and being pounded close together the link is now ready for the welding heat, and is replaced in the fire until that has been reached. The link is again withdrawn from the fire, placed on the anvil and welded by blows of the hammer, the link being turned over and back to secure the necessary working of the material to insure a perfect weld. The link, being welded, is placed in the groove of the beck horn, which projects from the front of the anvil toward the chain maker; the hinged dolly is then worked by the foot treadle so that it strikes the weld, and these blows smooth up the surface of the weld and reduce its size to that of the balance of the link. The finished link is now laid on the anvil and a few light blows of the hand hammer bring the proper shape, which is very much like the shape of an egg. Some 120 links will be made in a day's work, or one every four minutes.

The process of making 1¾-inch stud cable chain, as shown in Fig. 6, is as follows: Several bars of iron, each cut to length for one link, are placed in the fire to be heated. When one has reached the proper heat, about a cherry red, it is removed from the fire by the chain maker, placed in the link bending machine and bent into a U shape by his helpers. This link bending machine, which stands at the right of the chain fire, is a very simple contrivance for bending iron hot, and has been recently introduced to save time and labor and to perfect the shape of the link. It has not been very long ago since the iron was bent into the U shape by placing one end of it in a hole in the anvil and bending the iron around with tongs into a rough U shape, which was dependent on the skill of the helper for its uniformity. In the link bending machine one end of the heated piece is fastened on one side of the former and by means of the long arm the iron is bent around the former into the proper shape. The U-shaped link is placed back in the fire for reheating, and while this link is being brought

to the proper heat another piece of iron is bent into U shape, these operations being successive and methodical.

It is a well-known fact that iron at a high temperature scales rapidly when brought into the air, and this scale is often heavy enough to prevent a perfect weld being made. To overcome this objection, when the almost white hot U-link is withdrawn from the fire the ends are dipped in a pan of sand that stands conveniently near, the union of the sand and the scale forming a liquid slag that is expelled from the surface of the weld by the blows of the hammers, thus leaving the portion of the link to be welded clean and free from scale or dirt. After dipping the ends of the U-link in the sand the chain maker hooks it through the link last welded and lays it flat on the anvil. The two helpers now pound one end of the link with their sledges until it has been tapered down to an angle of about 60 degrees with the diameter of the bar. This process is called scarfing the link, and when one end has been thus scarfed the link is turned over and the other end scarfed in a similar manner. The two scarfed ends are now bent around so that they lap over each other, and the link being placed flat on the anvil the scarfs are pounded down on each other.

The link is now placed back in the fire for the final and welding heat. When this has been reached the link is withdrawn and laid flat on the face of the anvil and pounded by the two helpers with their sledges, the scarfs being driven close together, and the link thus welded. Between the blows of the helpers' sledges the weld is also pounded with a hand hammer by the chain maker, in order to give the iron the proper working necessary to secure a perfect weld.

Projecting from the anvil toward the chain maker may be seen the beck horn, the upper face of which is hollowed out to receive the under part of the link, while the hinged dolly, which is attached on the opposite side of the anvil in such a manner that it can be lowered to meet the beck horn, has its under face hollowed accordingly, so that when the dolly is lowered to meet the beck horn there is a space between them which just fits the welded portion of the link. When the link has received the proper amount of working with the hammers it is laid in the groove of the beck horn, the hinged dolly lowered and the helpers pound the head of the dolly with their hammers. This tends to smooth the weld of the link and reduce its size equal with that of the balance of the link.

The link is now placed on the anvil and helper No. 2 seizes in his tongs a stud and places it in the center of the link. This stud is made of cast iron and has its ends hollowed out to fit the sides of the link. While this stud is held in place by helper No. 2, the chain maker lays on the upper side of the link a grooved hammer. This hammer is struck with a sledge by helper No. 1 and the sides of the link narrowed to hold the stud firmly in place. The placing of this stud in the center of the link increases the tensile strength of the chain some 50 per cent. and prevents the link being pulled out of shape by any strain, as the effect of a strain is to tighten the stud in place and prevent the narrowing of the link that would result if a similar chain without studs was subjected to a high strain. Twelve fathoms of this size of chain can be made in one working day, or about 144 links per day, at the rate of one every three minutes.

Fig. 6.—Making 1¾-Inch Stud Link Cable Chain, the Welded Link Being Finished Under the Dolly, at the Rate of One Link in Three Minutes, or a Ton a Day, by a Chain Maker and Two Helpers.

All hand made chain is made on coke fires, the coke being crushed to certain sizes according to the size of chain being made. Artificial draft is forced into the fire by means of a powerful blower, the air entering the fire at the side, and is brought up into the body of the fire through a water cooled tuyere, which consists of a cone shaped cast iron piece with a hole through its center, through which the air passes, and with a chamber encircling this passage through which water constantly flows, to prevent the iron being heated and being burned out. This air, being forced into the fire, has a tendency to force the flames out against the workmen, and to counteract this it is necessary to have suspended over them a large fan, which is operated with power from the shafting of the shop.

The uses to which chain is placed are numerous, but as examples some of the better known may be cited, such as the following: Anchor chains for vessels; hoisting chains for cranes, dredges and steam shovels; switch, safety, brake and coupling chains for railroad use; rafting and logging chain; trace, wagon and heel chain; conveyor chain for log haul ups and saw mill machinery and the different grades of hardware chain.

Machine made chain is manufactured in three qualities—namely, proof or common quality, B. B. quality and B. B. B. quality. Hand made chain is usually made in about three grades—namely, stud link cable, lose link cable and crane or dredge chain.

Machine made chain is usually made from steel in sizes from 3-16 to ½ inch, inclusive, as are also trace and wagon chains. For the better grades of machine made chain in sizes from 3-16 to ½ inch, inclusive, iron should be used and also in all sizes and grades of hand made chain.

For the best grades of hand made chain, such as stud cable and dredging chain, a carefully selected grade of iron must be used, as often life and considerable valuable property depend on the quality of the iron from which the chain is made. A valuable anchor may be lost or a ship may be lost at sea by an inferior chain being used; a ladle of molten metal may be dropped from a crane in a foundry and thus endanger life and limb, and a faulty chain used in construction work in building may result in loss of life. Such an iron must combine high tensile strength, good welding qualities and ductility or elasticity, which is the ability to yield slightly to a sudden strain or jerk and resume its normal condition when the strain is removed. This is called its elastic limit, and a chain should never be used beyond that point. While high tensile strength or the ability to resist a high strain without deformation is an important item, ductility is equally as important. A sample of a chain made from iron possessing high tensile strength only will probably make a high record on the testing machine, but the chain from which the sample was taken, when placed in use, will probably go to pieces after a short usage.

The better grades of chain are all proved by the manufacturer before being shipped, to test both the quality of the material and the quality of the weld. No modern chain plant of to-day is complete without its testing machine, which varies in size and capacity with the productive capacity of the plant. The largest testing machine installed in a chain manufacturing plant in this country is one of 600,000 pounds capacity, capable of testing chain made from material as large as 4 inches in diameter. This is an exceptionally large machine, however, as they generally range from 100,000 to 400,000 pounds capacity. Chain is tested to a strain that is about one-third higher than the strain at which it should be worked in safety, and usually a sample of each order is tested to destruction to show its tensile strength, the tensile strain being about double the proof strain, and both vary with the size and quality of the chain being tested.

The most convenient position for the testing machine is down the center of the chain shop, so that the chain can be pulled by hand direct from the fire into the trough and tested.

An important modern addition to a chain shop is the chain puller, which is erected at the end of the testing trough and consists of a set of belts and pulleys operating two drums, over which the chain is wound from the trough or from any part of the shop directly on the scale. By an extension of the chain puller the chain can be then pulled from the scale directly on the shipping platform and into the car, passing on its way the blacking vat, so that in case the chain is to be dipped in blacking in order to protect it in transit it can be pulled under spools through the blacking.

The wear of chain may be divided into two classes: First, that which may be easily seen on inspection of the chain, and, second, that which may not be seen by a casual inspection, but to determine which the chain must be pulled to destruction or a link cut open and examined. The first kind of wear may be noticed principally at the ends of the links, or where the two links "bottom." This point of contact is the point of the most wear and usually shows lack of oiling or too soft material. The unseen wear is the most dangerous, as a link that from an outward inspection may pass as perfect may, without any warning at all, break at a time when the results will prove the most disastrous.

A chain link should properly possess as much fibrous quality as a bar of iron, but after a chain has been subjected to constant usage for some time the fibrous condition changes to a molecular condition which, on examination, will show that the material has become crystallized. This is caused often by sudden changes of temperature and is assisted by the chain being used too long a time without being attended to.

To obviate the "tiring" of a chain, as this is known, it should be made a point to anneal the chain at least once a year, which is easily done by subjecting the entire chain to a uniform heat in a furnace, care being taken that the chain should never be heated to more than a red heat. After remaining in the furnace at a red heat at least four hours, the chain should be permitted to cool gradually in a bath of sand. When the chain has cooled thoroughly it should be carefully inspected for links that show signs of visible wear, and these links should be cut out and replaced with new links. The chain should now be given a good oil bath and is then ready for use.

## Machine and Tool Industries of Chemnitz.*

Every effort is being made by Germany to negotiate favorable commercial treaties, and she has certainly been very successful thus far, for the lately concluded Russian treaty is looked upon as a distinct victory for Germany. It is easy to understand what all these treaties mean to industrial Saxony. One often wonders how this city (Chemnitz), with its large machine building works, has been so successful in competing upon the markets of the world, when a large proportion of the raw materials used comes from foreign countries, and a number of the large machine plants are located some miles from the railroads, so that everything must be hauled to and from the factories by means of trucks. The cheapness of labor seems a blessing here.

Though a general improvement in local industrial conditions was manifest in the past year, the machine building trade did not behefit particularly by the change. The annual reports submitted by the leading factories of Chemnitz to the local chamber of commerce show that almost invariably competition was very keen, orders hardly above the average and prices so low as to leave but a small profit, though in certain lines conditions were more favorable.

During the last six months of the year 1903 the machine tool industry continued to suffer from overproduction, a special effort having been made at this time to get rid of all accumulated stocks. The first six months of 1904 showed some improvement, through the increase of foreign orders, but on the whole the situation is not satisfactory. Orders are still so slow in coming that most machine tool manufacturers have on their pay rolls but a limited number of hands. Complaints are also made in this industry that coal prices are held too high, and that large consumers are forced to import Bohemian coal in large quantities. The iron syndicate is also looked upon with suspicion and has lost much credit through its recent manipulation of prices.

Manufacturers of machine tools used directly in the building of machinery, and those used in keeping other machine tools in condition, have reported slow but steady improvement in their trade, due largely to a considerable increase in foreign orders. Inland orders are few and far between.

The first half of the year, ended June 30, 1904, left the electrical machine manufacturing industry but moderately employed, but during the last six months conditions have improved steadily, so that at the present time this industry is fully employed. The Saxon electrical industry is especially highly developed, and Saxon motors, generators and transmuters have acquired an excellent reputation for durability and cheapness. The Saxon Government placed a number of heavy orders for electrical machinery that contributed much toward the improvement of conditions. Foreign markets also expanded satisfactorily. The heaviest foreign buyers were Holland, Belgium, Spain, South Africa, Russia, Austria-Hungary and the Balkan States.

* Abstract from a report from United States Consul Monaghan, Chemnitz, Germany.

# Lead, Copper and Tin in 1904.

BY E. A. CASWELL, NEW YORK.

The year 1904 has been somewhat remarkable and almost unique in the steady firmness of all metals at fairly high rates and in the absence of many rapid fluctuations, but, in place of that, longer waves of change in values, a steadily increasing demand and record consumption, or very nearly so, in all metals. The bugaboo of a seriously decreased consumption on account of it being a Presidential year dismayed many in whose memory the drastic days of the summer of 1900 were still fresh. By the middle of August the merchants of the country were convinced that the issues of the campaign were not such as to revolutionize business conditions, whether the Republicans or the Democrats assumed the reins of power. By the middle of September the conviction of Mr. Roosevelt's election became very general and confidence was evident on all sides. Some of the buyers, prior to the election, began to purchase so as to discount any later rise, but the mass waited for a certainty, and then with one accord began to buy in such volume that our markets advanced all along the line.

### The Lead Market.

The essential feature of the lead market has been its domination by the American Smelting & Refining Company, although some incidents went to show that its power was subordinate to the higher forces of supply and demand. There is no question that in the long run the influence of the company has been used to steady prices and to place supply and demand on an even level. There is also no doubt that the year 1904 differed from some previous years in that during those previous years the supply was held in check so that it might not seriously exceed the demand, but this year producers have been permitted to turn out the maximum of which their mines were capable; nevertheless the supply of actual domestic lead has been insufficient. Heavy drafts have been made on the lead coming in free from imported ore, and at the close of the year the article was so scarce that it looked almost as if importations would be necessary. The year opened with the price of common lead at New York 4.25 cents, which was raised on January 14 to 4.40 cents and on January 20 to 4.50 cents. It was then lowered on January 29 to 4.40 cents and remained there until March 1, when it was again advanced to 4.50 cents and remained there until May 20, when it dropped to 4.35 cents. On May 27 it went to 4.25 cents and on June 14 to 4.20 cents, and again on July 25 to 4.10 cents, where it remained until August 29, when it was advanced to 4.20 cents and remained at that figure until the first day of December, when it was advanced to 4.60 cents.

An analysis of the above named changes indicates that they were made entirely in obedience to the laws of supply and demand and that they were not made nearly as much that they might gather in cheap bullion and sell high lead as the company is generally credited with. In order to accomplish the latter the price should be low during December, January and February and in June and July, which are the lightest months of demand, and high during the other months, but such was not especially the case. It is generally assumed that the United Lead Company is thoroughly under the protective wing of the American Smelting & Refining Company, and it is assumed that the latter will aid it in buying cheap lead. The question, however, is often asked as to how that can be accomplished on the part of a public company with open prices. It is, however, easy to see how on frequent fluctuations sellers can tip them the wink and so sell most of the low lead to their special friends and let all the outsiders get the high priced lots. It could then easily be shown that stockholders of the American Smelting & Refining Company had suffered no loss.

During the latter half of November the situation as to price was really a humorous satire on the fundamental laws and usages of trade. The edict of the American Smelting & Refining Company went forth that all shipments were to be at the convenience of the sellers some time after a given date, about three weeks off, and that the price should be the price of the company current or proclaimed to be current on the day of shipment. This was really a jug with three handles, and all three of them over on the seller's side. It was alleged that the purpose of this method was to discourage speculation both on the part of consumers and outside speculators. The plan met with eminent success. In fact, it went a long way toward paralyzing all trade except such as was absolutely necessary. Presumably the object of the company was to temporarily check a demand which it could not fill until conditions of supply and demand could be reversed, so that during the duller months of December, January and February a surplus might be accumulated.

The history of the outside companies has followed that of the large concern, but it has not been so at all times, nor have the companies by any means been merely tagging on. For quite a stretch along the late springtime and during the most of July at St. Louis the soft Missouri leads commanded a premium of $2 or $3 a ton above the price of the American Smelting & Refining Company, and during the month of November we were treated to the ridiculous situation of a nominal price of the American Smelting & Refining Company at St. Louis of 4.12½ cents, while actual spot lead was selling there very freely at 4.40 cents. The smart jump to 4.60 cents on December 1, coupled with the normal end of the season of demand, placed the market all around on a more even keel and a more rational basis. It is a question of great doubt but considerable interest to consumers whether all the contracts of the American Smelting & Refining Company with miners are based entirely on a sliding scale or on several flat prices which vary within certain variations of the price of the American Smelting & Refining Company or whether they are made for a year or a term of years on a single flat price which is to be paid by the buyers, whether prices go up or down. Light on this subject might make clearer what appear now to be vagaries of action on the part of the sellers in fixing prices. The probabilties are that they are somewhat forced into meeting the desire of the individual shipper and that their contracts are so varied that no possible course on their part can make all their contracts all to the good all the time. It is probably a problem with complex drawbacks and compensations. The fact that they kept prices low when the outside market was soaring above them would indicate a sliding scale basis and a desire to get in as much bullion as possible at the low rate, for if they are buying on a flat price it would naturally be to their advantage to carry prices as high as possible, except that if this were done for a year or two shippers would demand a much higher basis for their next contracts. It requires, therefore, no great perspicacity to see that they have no easy solution of their problem of keeping the shippers reasonably satisfied of maintaining in equipoise the relation of supply and demand and at the same time keeping a weather eye on their dividends.

The course of the price of its stock certainly shows the company to be in a brilliantly prosperous condition. The common stock during the year has been enhanced in value about 100 per cent. and the preferred stock about 20 per cent. Early in the year some roseate and scintillating predictions were made regarding the expected magnificent physical condition of the white lead works of the United Lead Company, which was to be turning out thousands and thousands of tons by August. But the delays which always appear to be inevitable in such matters played their part, and the end of the year sees the mammoth works projected at Granite City and at Perth Amboy still in the building stage. It is easily possible that the backwardness of the work has been the result of the persistent expectation of a merger of the National Lead Company and the United Lead Company. All through the spring the public was kept on the tiptoe of expectation in regard to the matter, and the story thereof reads like a commercially revised edition of "Betsy and I Are Out," for it was on and off and on

again, and partially on, and in abeyance, and entirely off, week after week. Then came a long summer hiatus in the matter, with a burst of promise of completion in the fall, only to be followed by a complete cessation and abandonment of all negotiations. The programme now appears to be that the United Lead Company will push building vigorously and in 1905 do those things which were left undone in 1904.

During the year the Federal Mining & Smelting Company got itself into full working order and listed its stock on the New York Stock Exchange. It has also made a contract for a term of six years with the American Smelting & Refining Company to deliver all its bullion product to it. Under the beneficent management of the American Smelting & Refining Company all the smaller companies have flourished. The St. Joseph Lead Company, which is the cynosure of all eyes in the lead mining camps, has increased its milling capacity nearly 33 per cent., and has sufficient ore to keep running actively. The Central had bad luck in strikes and in other details, and will not have produced in 1904 more than two-thirds as much as in 1903, while the Anchor and Desloge mines and the Granby district have not increased materially. The year has not been conspicuous for the discovery of any vast lead deposit.

### The Copper Market.

The year in copper has been one of the most sensational that we have had for many years. During 1900, 1901 and 1902 Germany was down in the dumps generally in trade, and especially in copper. There appeared to be almost a lethargy, which could not be shaken off. Last year, however, the country woke up with a mighty rush and appeared to make up for lost time by immense purchases. Our total exports in 1900 were about 152,000 tons, in 1901, 92,000 tons; in 1902, 164,000 tons, and in 1903, 138,000 tons. The total exports for the first eleven months of this year were 227,888 tons, and December will add about 20,000 tons, making a grand total of 247,888 tons, which will be an increase over the shipments of 1903 of 109,453 tons; and this beats all previous records, since the largest volume of previous exports was 164,451 tons, sent out in 1902. The result of these exports has been to drain this country absolutely of all reserves in the storehouse or at the mine, and it is probable that there has never been so small a quantity on hand, even at times when actual copper was reimported to this country. That has occurred several times in the last fifteen years, but almost always when there was more or less manipulation and stock on hand which was held out of the market. If any should come back now it would be from absolute necessity and because there is an actual shortage at this point. The lowest price of the year was touched in February, when it was 12.25 cents, with very free sales, and the highest point has been in December, when 15.12½ cents was paid for some parcels, and even 15.25 cents, although the broad market was at no time over 15 cents for large lots. During the first five months fluctuations ranged chiefly from 12.37½ cents up to 13 cents, with a short lived little boom in April and part of May, in which the price ran up to 13.25 cents. Demand for the year has about followed the course of general trade, having been very fair during the first four months, then falling under the shadow of politics and remaining very dull until after the election, when trade sprang up and caused the domestic buyers to come into a market which was very bare of stock. Their buying, on top of the enormous trade for Europe, caused the price to go to 15 cents. One hears all around more or less talk of still higher prices and a 16-cent market, but possibly the one mistake which has been made in trade more often than any other is to believe in the middle of a boom, or even toward the end of it, that the ruling conditions have come to stay. Europe appears to be remarkably regular in its pendulum swing. It calls for an enormous quantity over two or three years, and then drops off for two or three years, so that instead of a continuation of this heavy demand it is more likely that there will be a falling off in 1905, which may come just in time to furnish the large quantity for America which the boom that is looked for will require if it comes.

The reasonably high prices have stimulated production on all sides, and yet there have not come any very great new sources of supply into the market. The Greene, the Shannon, the Utah and the Tennessee, and several of the Michigan mines, the Phelps Dodge properties and the Old Dominion, are all on the increase, but Alaska has not yet fulfilled its big promises by becoming an important factor in supply, although it still seems to be a small cloud on the horizon which may later become important. The strident noise about copper mines in South Africa has thus far not materialized into very much actual red metal. Mexico has pushed along to the front, and several properties there, notably the Mitchell Mining Company, give promise of an immense output. The merry war in copper and in politics in Montana between Amalgamated and Heinze continues without abatement, although a truce or peace is heralded about as often as Mr. Heinze comes to New York or as some of the Boston stock operators desire to boom copper stocks. There have been no especially new uses found for copper during the year, but the growth of the electrical demand has been very great and electricity bids fair in the not far distant future to be the medium of motive power for the railroads of the entire country. This feature opens up a future for the use of copper which almost strains one's powers of imagination.

Perhaps to a greater extent than ever before copper, through the medium of Amalgamated stock, has become an object of national attention. The most sensational bunch of commercial pyrotechnics that ever walked (T. W. Lawson) has dragged Amalgamated so vividly into public notice that we may expect to see more rampant speculation in it by a broad public than ever before. Of course all insiders know that the price of the stock has very little relation to the actual price of the red metal. There is a faint show of supposition that high copper will in the end increase the dividends and that low copper will lower them, but outside of this all inquiry into intrinsic values appears to stop.

### The Tin Market.

A general review of the tin market shows that the only influence of moment was the shadow of the election which hung over the market during the month of June. Outside of that there was simply one long, slow decline to June, and then an equally steady advance to 30 cents. The market opened the year with the price at 29.50 cents. Over the next four months it ran along down to 28 cents, and at the end of May to 27 cents. During the month of June it fell to 25.85 cents, but before the end of July it was again up to 27 cents, by the end of September up to 28 cents, by the end of October to 29 cents, and by the end of November to 30 cents. The old uses of tin still continue to be dominant ones. It should, however, be noted that these uses have well nigh doubled within the past ten years, but shipments to meet that increase have only been possible on a general advance in the price of nearly 8 cents per pound. Twenty-five years ago tin was considered to be exceptionally high and the market very wild at 23 to 25 cents, while 15 cents was considered a low figure. Over a year tin was expected to average about 18 to 19 cents, and usually fulfilled the expectation, but during the last few years, entirely through the force of inherent strength, the market has accepted a new schedule, with 30 cents as a sort of high water mark and 25 cents for a dead low tide. Tin continues to be the one metal which goes on steadily increasing in demand without any commensurate finding of new sources of supply.

Along in the years 1893, 1894 and 1895 the manufacture of tin plates in England and America reached about 10,000,000 boxes, and about that time the production in the Straits and from all other sources reached about 75,000 tons. At the present time the production of tin plates is about 20,000,000 boxes and the production of tin close to 90,000 tons. We see, therefore, that while the production of plates has actually doubled, tin has only increased about 20 per cent. As an offset it must be noted

that the coating on plates is now not nearly so thick as it was, and consequently more boxes can be made with a ton of tin than before. At the same time the use of tin in many other lines has increased materially, and unless some new sources of tin are found, or if the Straits should begin to peter out, or unless some substitute for tin be invented, there is no reason why the range of high and low may not creep up 5 or 10 cents a pound. During the last ten years Bolivia has run up from about 4000 tons to 10,000 tons. The Banca sale has increased from 7000 tons to 14,000 tons, while the Billiton has fallen from about 5000 tons to 3500 tons. The Cornwall district holds its own at 5000 tons, and the Straits have run up from 45,000 tons to 52,000 tons. It will therefore be seen that 25 and 50 years ago the Straits Settlements produced practically all the tin that was used, and they are furnishing three-fourths of it to-day. The only real source of new supply, Bolivia, turns out tin whose quality is materially below that which comes from the Straits. Alaska is still almost a negligible factor in the field and seems likely to remain so.

Another very remarkable fact about tin is that with the flight of time no substitute has ever been found for tin for the uses to which it is put. One of the most interesting features of the article is that the London market has been partly transferred to New York. A dozen years ago practically the entire importation of the article was effected through two or three houses, but little by little London firms came to have representatives in this city, so that now almost every London house of any moment has its representative here. This fact has changed the complexion of the market considerably, for the buying of the two large consumers, the Tin Plate Company and the American Can Company, is intrusted to one buyer, who supplies them chiefly from the East. This demand of 35 to 40 per cent. of all the tin used is therefore taken out of the market, and, as a matter of fact, there is only about 20,000 outside tons to be sold, and as seven or eight firms are constantly competing for that trade it is easy to see how prices rarely get much above the cost of importation and very frequently drop far below it. On the other hand, the concentration of the buying power has gone a long way toward eliminating outside speculation, and it may be safely said that there is at the present time less outside speculation in the metal in America than ever before. The importation for the year will run very close to 35,000 tons and the shipments from the Straits will be close to 56,000 tons.

**A Unique Railroad.**—The little railroad called the Inter-Works Railroad, which runs between the various plants of the Westinghouse Companies from East Pittsburgh to Trafford City, near Pittsburgh, holds a unique position among transportation lines. Its method of operation now consists of five distinct systems of motive power. The first is the old fashioned trolley line, with overhead wires for supplying power. The second is the third rail system which supplies power to a motor car from a rail. A third system is known as the button system, by which a motor car is, while in motion, always in touch with a button, thousands of which are scattered along the road and each giving power to the motors. A fourth is the latest invention in electrical railroading, known as the single phase alternating current, by which wires supply power to the older form of trolleys, but at enormously high voltage, and is considered now the most economical method in electric railroading. The final system is the ordinary locomotive, which operates over the same line, supplying motive power for handling freight cars. The purpose of having so many systems attached to it is to permit the company to experiment with the constantly arising improvements.

Magnetic alloys from nonmagnetic metals have been successfully produced in recent experiments. It has been found that with the same manganese that gave a practically nonmagnetic iron alloy a magnetic copper alloy may be produced. The nonmagnetic metals, copper, aluminum and manganese, combined in certain proportions, produce an alloy having considerable magnetic properties, but no combination of copper and aluminum produces a magnetic alloy; hence the presence of magnetic properties must be ascribed to the manganese. The three metals severally all remained nonmagnetic when cooled to the temperature of liquid air.

## Car and Locomotive Output in 1904.

Returns received from practically every car building plant in the country show that approximately 62,950 cars have been built, including cars for use on elevated railroads, but exclusive of street and other electric cars. These figures, of course, do not include cars built by the railroads at their own shops. Of the above total approximately 60,806 are for freight service and 2144 for passenger service; 60,955 are for domestic use and 1995 are for export. All the figures this year are official, except in the case of one of the smaller equipment firms, where it was necessary to make an estimate from our own current records, so that the sum total as given here may be accepted as very nearly correct. This is the smallest car output since 1897, when 43,588 cars were built. Business conditions looked very uncertain at this time a year ago, with gross earnings falling off rapidly, while operating costs continued to grow higher; and in view of the recent large equipment purchases, beginning in 1898 with more than double the 1897 output, and continuing to increase until the high water mark of 164,547 cars was reached in 1902, it was wholly to have been expected that retrenchment would show first of all in equipment orders. A large amount of old rolling stock was overhauled and put into service at the railroad shops, supplying current needs in more or less temporary fashion, and it is only since the early part of the fall that new orders have been coming in rapidly. During the past three months over 70,000 cars have been ordered, some 10 per cent. more than the total output for the year. The majority of these are for delivery in the early part of 1905. During the year 1942 cars were built by three firms in Canada. The following table shows our estimates for cars built during the past six years:

| Year. | Freight. | Passenger. | Total. |
|---|---|---|---|
| 1899 | 119,886 | 1,305 | 121,191 |
| 1900 | 115,631 | 1,636 | 117,267 |
| 1901 | 136,950 | 2,055 | 139,005 |
| 1902 | 162,599 | 1,948 | 164,547 |
| 1903 | 153,195 | 2,007 | 154,808 |
| 1904 | 60,806 | 2,144 | 62,950 |

During the year 3441 locomotives were built at the various locomotive plants in the country, as against 5152 last year. This figure is officially correct and required no estimating. The number for the current year includes 95 electric locomotives. These figures do not include locomotives built by the railroads at their own shops nor orders given for repairs. It is interesting to note in this latter connection that during the past year an order was given by one of the leading railroads in the country to one of the largest locomotive builders for the repair of 600 locomotives. The following table shows our figures for locomotive building for the past 13 years:

| Year. | Number. | Year. | Number. |
|---|---|---|---|
| 1892 | 2,012 | 1899 | 2,473 |
| 1893 | 2,011 | 1900 | 3,153 |
| 1894 | 695 | 1901 | 3,384 |
| 1895 | 1,101 | 1902 | 4,070 |
| 1896 | 1,175 | 1903 | 5,152 |
| 1897 | 1,251 | 1904 | 3,441 |
| 1898 | 1,875 | | |

—*Railroad Gazette.*

Experiments with submerged coal, begun at Portsmouth, England, in May, 1903, have shown that after a year's submergence the coal has a greater calorific value than samples of the same coal stored on land and covered with tarpaulins. Only a portion of the coal in question has been burned, as it is the intention to carry the experiments further by comparing the results after a still longer period of exposure to the action of sea water. The coal submerged consisted altogether of 10 tons, of which 2 tons were contained in each of five cribs. The amount stored on land was the same.

# The Thompson-Ryan Motor and Its Application to Machine Tools.

## An Electric Motor Giving Wide Speed Range by Means of Field Control.

After exhaustive tests and elaborate experimenting machine tool builders and users who are confronted with the problem of electric drives are, with the aid of motor builders—who, by the way, are also included in the second class mentioned—obtaining results with the variable speed motor which are highly gratifying. Recent strides made in the manufacture of this type of drive with the special object of adapting it to machine tool practice seem to promise it still greater achievements in the near future.

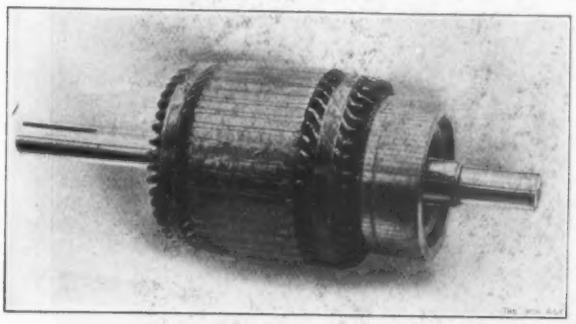

Fig. 1.—The Completed Armature.

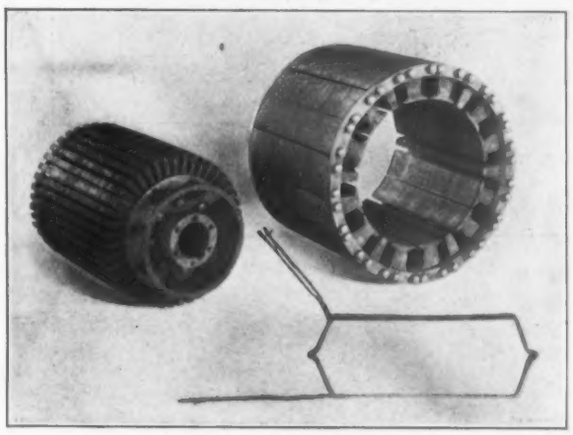

Fig. 2.—The Armature Core and Coil.

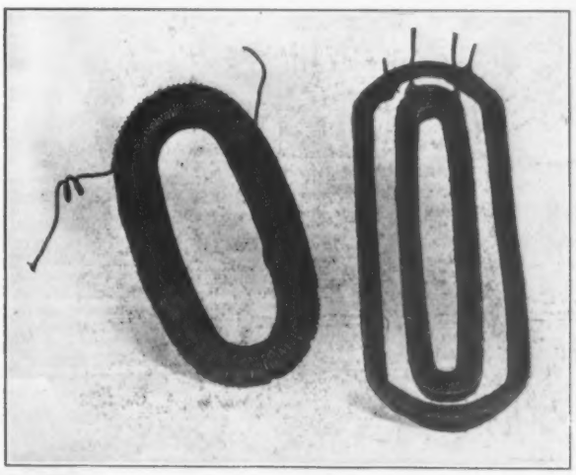

Fig. 3.—A Shunt Field Coil and Two Balancing Coils.

It is generally conceded that field control for a variable speed motor is the most simple that can be devised. The advocates and builders of the various multiple voltage systems use field control for a portion of the variation, depending upon what the motor will stand, for when working under full load the ordinary type of shunt or compound wound motor cannot have its field strength materially reduced.

In order to give a clear conception of the principles which underlie the operation of the Thompson-Ryan motor it will be necessary to point to features of earlier types of motors which have proved obstacles in the way of machine tool driving and upon the elimination of which the design of this motor is founded.

The series wound motor is the most simple form of electric motor and its construction is familiar to every one.

Fig. 4.—A 15 Horse-Power Motor Having a Speed Range of 350 to 1750 Revolutions Per Minute.

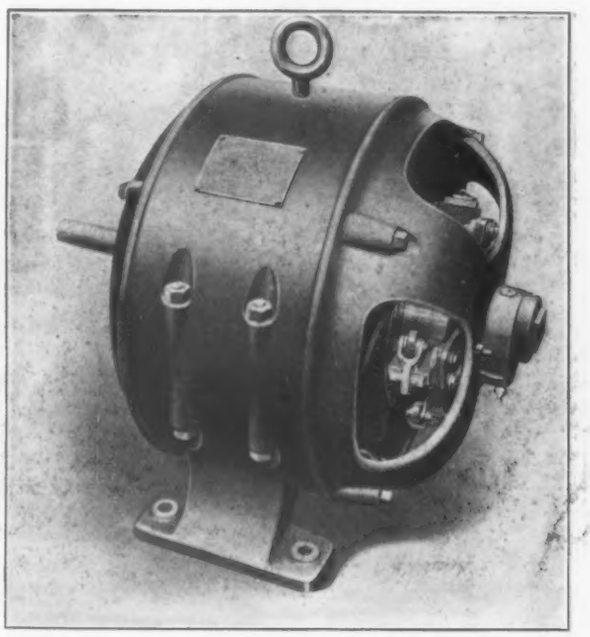

Fig. 5.—A 15 Horse-Power Motor Having a Speed Range of 450 to 1800 Revolutions Per Minute.

Although it still holds undisputed sway for crane and car driving the difficulty of regulating its speed is a drawback in machine tool operation, since it depends upon the load and considerable resistance in series with it is necessary to obtain any degree of control whatever.

A combination of the shunt and series wound motors makes the ordinary compound wound motor, which is the type that is now used for constant speed work and for the many systems of speed control known as multi-voltage, balanced voltage, &c. This combination makes advantages of the defects in the shunt and series motors, and gives a motor with good regulation under all loads which it is able to carry. From the theory of the compound wound motor it can be shown that if the shunt field current is reduced, thereby weakening the magnetic field due to that current, the motor will speed up. Prac-

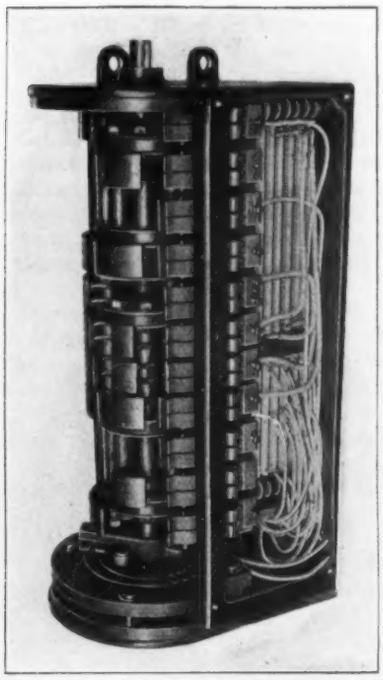

Fig. 6.—The Thompson-Ryan 15 Horse-Power Reversible Controller.

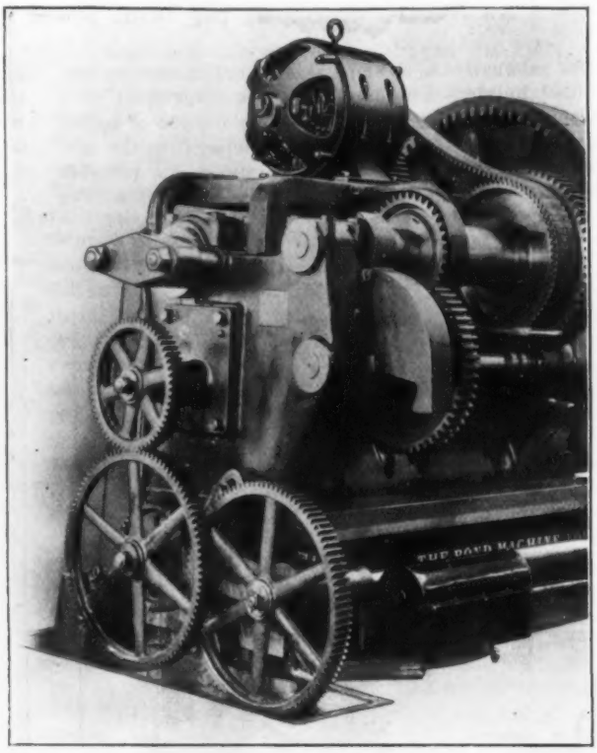

Fig. 8.—A 15 Horse-Power Motor Driving a 72-Inch Pond Lathe through a Morse Chain.

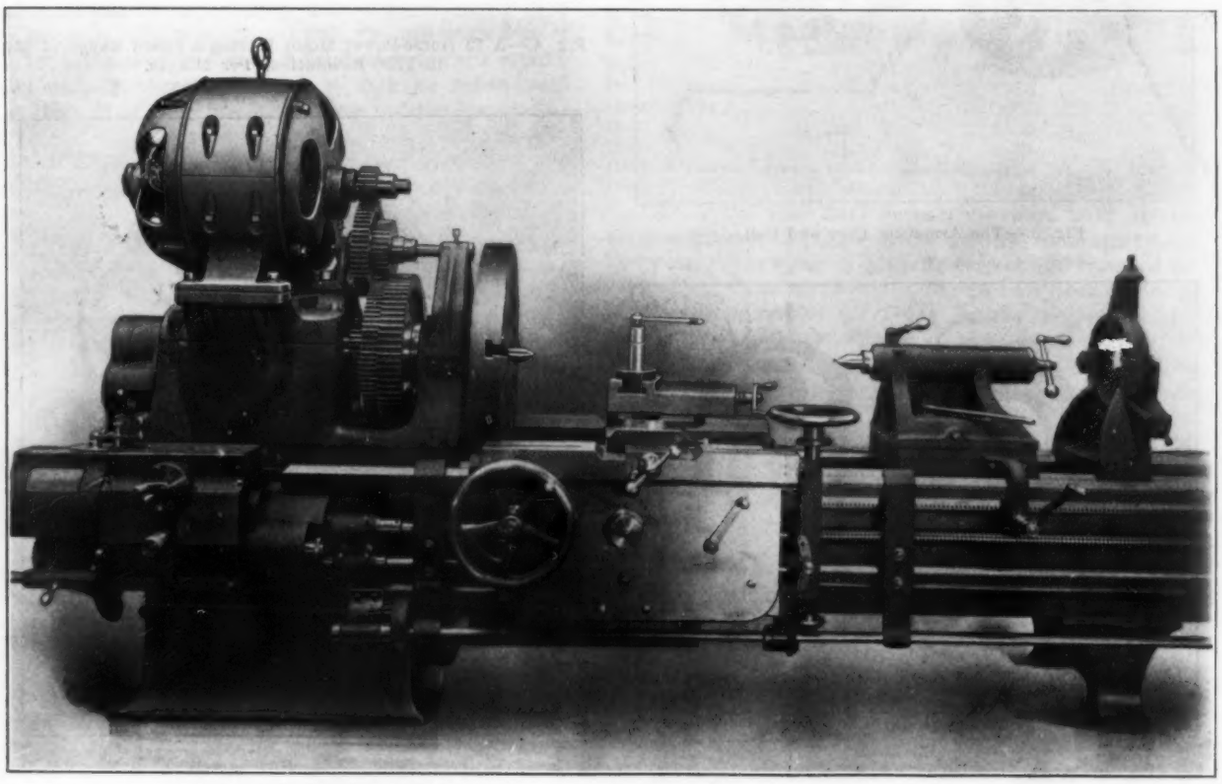

Fig. 7.—Method of Attaching a 10 Horse-Power Motor to a 26-Inch Schumacher & Boye Lathe.

The shunt wound motor has the same objection in speed regulation, but to a less extent. It is theoretically a constant speed motor, but in practice its speed varies slightly with the load, and a very large motor is necessary for accurate, constant speed with a small range of load.

tically the motor bears out the theory, but the amount of variation rarely exceeds 50 per cent., though in some cases a variation of 100 per cent. has been obtained, or a ratio of 2 to 1.

If any attempt is made to raise the speed of the motor beyond this point it will race and destructive sparking will result. It is here that armature reaction begins to count. When a conductor, such as an armature bar, carries a current there is set up about the conductor a magnetic field which envelops the conductor and whose direction depends on the direction of the current in the conductor. This field may be considered as a cylinder revolving about the conductor as an axis. When a conductor carrying a current is revolving in a magnetic field set up by another source it is plainly to be seen that the former field will draw the latter out of shape. This is exactly what takes place in any motor or dynamo where the conductor is an armature bar and the field is that set up by the usual field coils. In a motor of the ordinary type this distortion is overcome to a degree by making the shunt magnetic field as strong as possible. It will be seen at once that if this field is weakened the effect of the field set by the armature conductors will be to alter all the conditions which formerly made the operation satisfactory. The field will be distorted, thereby changing the point at which the field is the proper strength for sparkless commutation. The field under which commutation does take place will be too weak and the speed of the motor will decrease with an increase in load.

It is evident from the foregoing that if the field distorting influence of armature reaction can be done away with, the result will be a compound motor having a speed range that will practically be limited only by mechanical considerations.

This is what has been done in the Thompson-Ryan variable speed motor, and, briefly, this is accomplished as follows: Inside of the field ring, which is common to all motors, and surrounding the armature, is placed a laminated bushing ring having slots suitably arranged for the reception of the balancing coils. These coils are so wound into the bushing ring that they lie parallel to the armature bars and are comparatively close to them. The current in the balancing coils flows in the opposite direction to that in the armature bars, and hence the magnetic field which surrounds each armature bar, as before mentioned, is neutralized or balanced by a magnetic field surrounding the balancing coil conductors, and which is opposite in direction. In this way armature reaction is overcome, together with all its attendant evils.

The balancing coils are also wound about a portion of the laminated bushing ring in such a manner as to furnish a secondary field between the main pole faces. It is in this field that the reversal of the current in each armature conductor takes place as it passes from a north to a south pole, or *vice versa*. This secondary field being the result of the current load on the machine is proportional to the load. This is the proper condition for sparkless commutation. A third effect of the balancing coils is to maintain the field sufficiently to keep the speed of the motor from falling when operating under full load and at high speed.

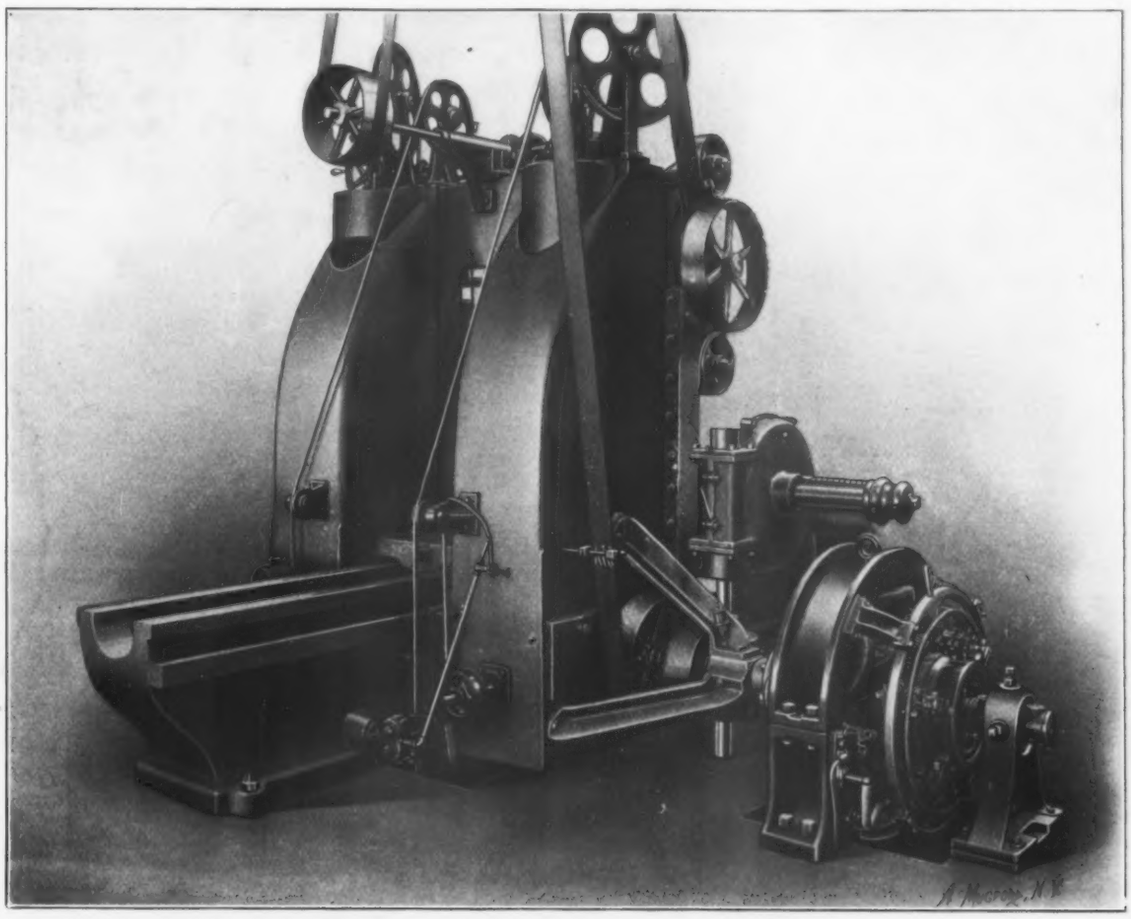

Fig. 9.—A 10 Horse-Power Motor Connected Direct to a 24-Inch Ingersoll Milling Machine.

Referring to Fig. 2, the laminated bushing ring is shown at the right. This is built up of steel punchings having a high permeability and is held together by a cast steel ring. All of these motors being six-pole machines, the six pole faces are easily distinguished. The usual pole necks of the cast steel field ring bear closely upon the outside, making practically one continuous pole piece. Between the pole faces will be seen what is known as the "commutation lug," as it is about this lug that the balancing coils are wound and under it commutation takes place. At the right in Fig. 3 are the two balancing coils, of which there is a pair for each pole. The inner coil is the one which surrounds the commutation lug, while the outer coil lies within the two pole faces, adjacent to the lug. They are all connected in series, and are in series with the armature. A shunt field coil is shown at the

left in Fig. 3, and it will be noted that it is not wound on a metal bobbin. It is highly insulated and when in place in the motor it is held firmly between the field yoke and the laminated bushing ring. Both the field and balancing coils are form wound, except in the largest sizes of balancing coils, which are wound by hand.

Referring again to Fig. 2, will be seen the armature core and coil. The core is built up of sheet steel laminations stacked on a cast iron spider. The armature coils are form wound square or rectangular wire, except in some of the largest sizes, when the winding is of bars, put in place by hand. The slots in the armature core are protected by fiber and oilcloth before the coils are put in place, and the coils are held by hard wood wedges and

struction is clearly shown. Fig. 5 also shows a 15 horse-power motor, but its minimum speed is 450 revolutions per minute, and its maximum is 1800. This is the shape in which motors are usually furnished for machine tool drive.

When running at the maximum speed the operation of these motors is perfect. There is no sparking, and nothing about the motor aside from its high speed indicates that it is operating on a weakened field. The usual full field current is 1.25 amperes on a 250-volt motor, and at a maximum speed this is reduced to 0.10 and in some special cases as low as 0.06 ampere. Speed variations of 500 per cent., or 6 to 1, are easily reached, and 1000 per cent, or 11 to 1, has been obtained experimentally.

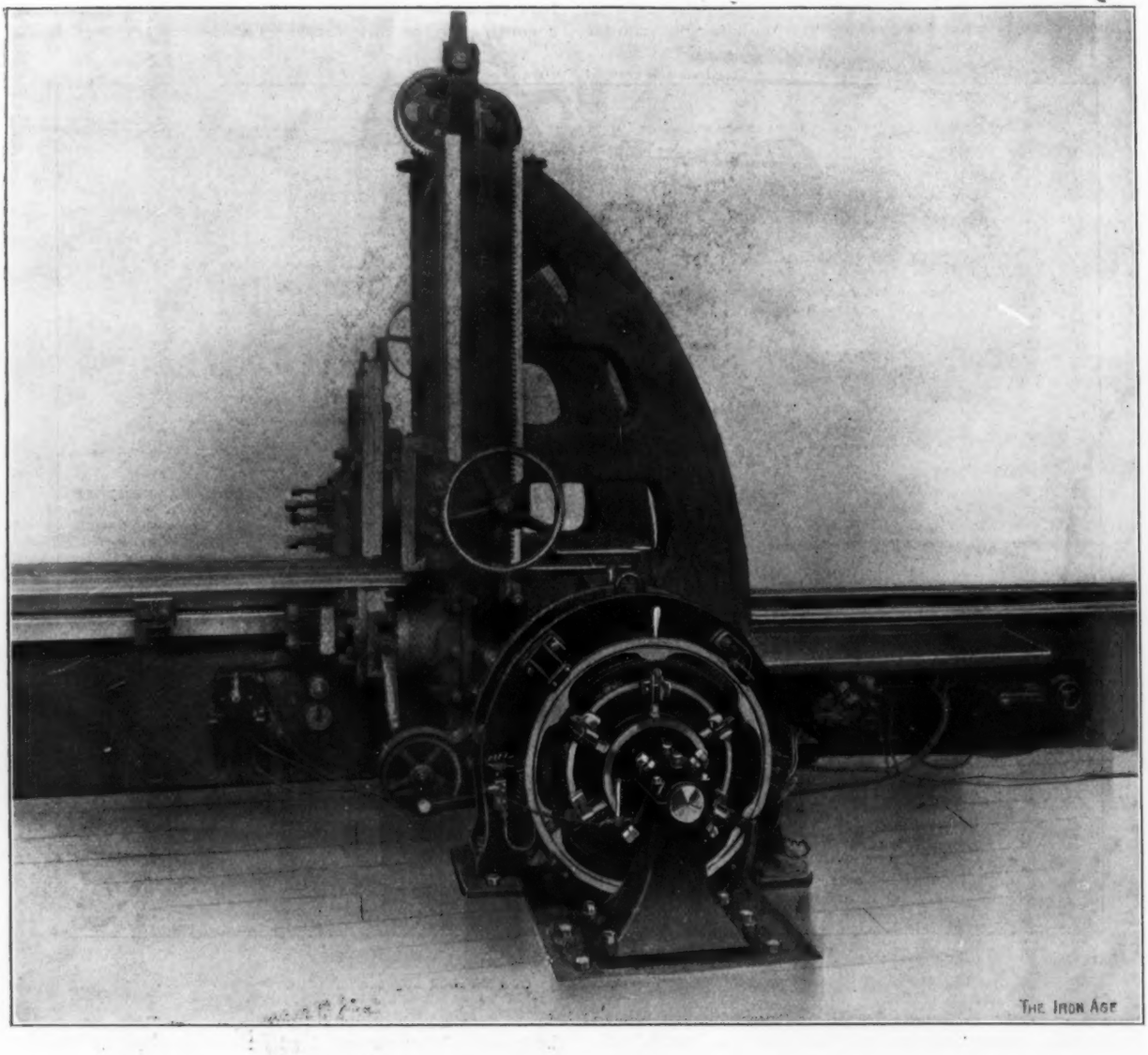


Fig. 10.—A 20 Horse-Power Motor Attached to the Driving Shaft of a 48-inch Pond Planer, Eliminating Belts Entirely.

by binding wire wound around the outer ends. No wire is placed on any part of the core. A completed armature is shown in Fig. 1.

The field ring is of annealed cast steel, with the pole necks cast solid. In some of the smallest sizes the field ring and bushing ring are built up of the same set of steel punchings. In such cases a cast iron casing surrounds this ring and carries the motor feet and end bearing frames. The shaft is of cold rolled steel, with journals which run in self oiling bearings of phosphor bronze.

The brush holders are of the box type, permitting the motor to operate in either direction. They are mounted on a solid yoke ring, which, when once adjusted, requires no changes, regardless of the load.

Fig. 4 shows the commutator end of a 15 horse-power motor which has a speed range of 350 to 1750 revolutions per minute. It is hardly possible in the cut to distinguish the various windings, but the brush holder con-

The controller which is required for this motor in its simplest form is an ordinary starting box and a field rheostat. For service where the motor is not required to reverse a form of starting box and rheostat combined is used. This is accomplished by continuing the field contact segment in a series of button points between which are placed the field resistances. The armature contact points are continued in solid segments. Various forms of this controller are manufactured by several well-known makers.

A controller known as the Thompson-Ryan drum controller has been developed for use in connection with reversing motors. It consists of a drum of sectional construction with solid copper segments. These segments are so arranged that when the drum is in its middle position the armature is short circuited with full field strength. On one end of the drum is an arm which carries two contact fingers. These fingers bear upon two

parallel solid segments during part of the revolution and then pass on to two parallel rows of contact buttons. Underneath the drum are the starting and field resistances. The other details of construction are clearly shown in the cut, Fig. 6, which is from a 15 horse-power 250-volt controller.

The operation of the controller is as follows: Starting with the middle position, the field takes full current, but the armature gets no current until the middle group of contacts are passed and the side contacts come into play. The armature now takes current through the starting resistance, and in three steps this is cut out. The motor now has full armature and full field current. Further movement of the drum causes the arm on the end to move over the contact buttons, between which are arranged the field resistances. The motor now speeds up. There are usually 20 of these contact buttons, giving 20 separate speeds, but it can be seen that in case it is necessary the number of these points can be increased, giving much smaller steps as the speed increases. In stopping the motor the above operations are reversed until the starting resistance is all cut in and the armature current is cut off. The middle section of drum segments now comes into action by short circuiting the armature through the starting resistance and then cutting out this resistance and leaving the armature on a dead short circuit. This unusual treatment does not injure the motor in the least, neither does it cause sparking and flashing. This feature is of value with motors driving lathes, where it is often desirable to make a rather quick stop. In connecting the motor and controller but four wires are required, two for the field and two for the armature.

In Fig. 7 is shown a 26-inch lathe driven by a 10 horse-power motor. This arrangement is very good considering the fact that the head stock is but slightly altered from the usual standard. A better arrangement would have used a slower speed motor, requiring but one gear reduction and having the gears run in oil.

This motor is rated at 10 horse-power at a minimum speed of 350 revolutions per minute and has a maximum of 1750 revolutions per minute. The controller is of the reversing drum type, has 20 points in its field rheostat, and is operated by the hand wheel at the right of the carriage.

A very good and simple drive is shown in Fig. 8, where a 15 horse-power motor drives a 72-inch heavy lathe. The usual cone pulley is replaced by the chain sprocket, and it is evident that there is but one reduction in speed between the motor and the back gears.

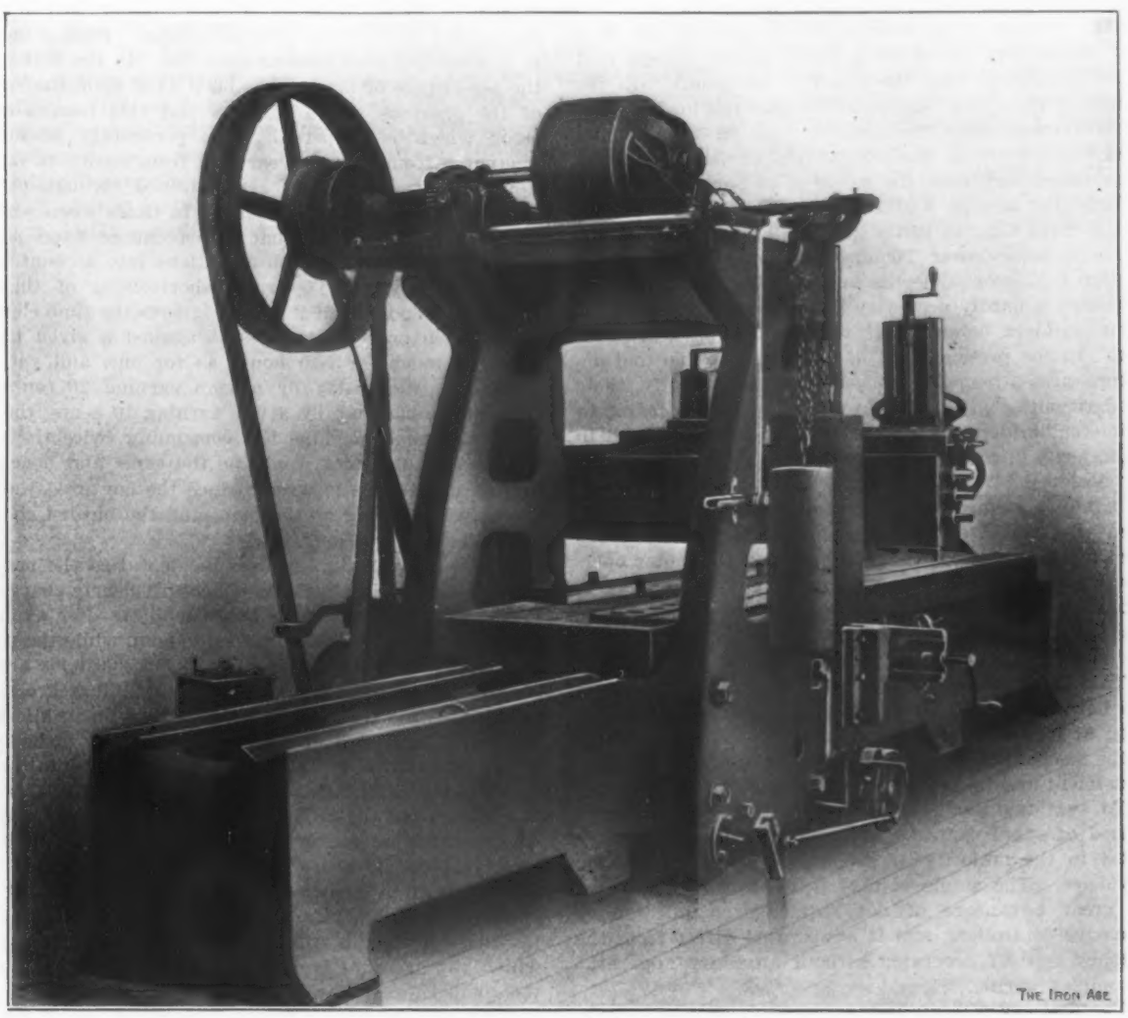


Fig. 11.—A 12½ Horse-Power Motor Geared to the Driving Mechanism of a 36-Inch Pond Planer.

The motor develops its full horse-power at all speeds between 350 and 1750 revolutions per minute. The controller is operated by a crank on the carriage working through bevel gears and a splined rod to a gear on the drum shaft.

A good arrangement is that shown in Fig. 9, where a 24-inch Ingersoll miller is driven by a 10 horse-power motor. The motor is coupled direct to the main driving shaft, the belting shown serving only to drive the cross rail. This motor is built on a standard Thompson-Ryan generator frame. Its minimum speed is 125 revolutions per minute and its maximum is 750 revolutions per minute. Since it operates in one direction only the controller is of the square starting box type provided with 20 points in the field resistance. An inclosed motor of the standard type would be necessary in case it was to be used in places where it is exposed to dust or moisture.

An installation which is of interest is shown in Fig. 10, where a 48-inch planer is driven by a 20 horse-power

200 to 1000 revolutions per minute motor. This motor is coupled direct to the main driving shaft of the planer and takes the place of the usual tight and loose pulleys. The motor reverses with each reversal of the planer, and by field control only gives a range of cutting speeds from 20 feet per minute to 60 feet per minute. A small pilot controller, operated by the usual dogs on the bed, controls the main controller shown at the right.

Complete details of this interesting application of the Thompson-Ryan variable speed motor will be published in a later article.

A common application of variable speed motors is that shown in Fig. 11, where a 12½ horse-power motor is geared to the driving mechanism of a 36-inch planer. This motor runs at speeds of from 800 to 1600 revolutions per minute, and its controller is arranged to give eighteen intermediate speeds. The first speed reduction is made through a rawhide gear. In general this is a most satisfactory drive for a small planer, except that in this particular case the motor is too small. On the reverse at the end of the return stroke the load goes to 75 horse-power when the motor is running at maximum speed. However, at the end of six months' operation under these conditions the motor is in good condition.

Referring to page 8 of *The Iron Age* for December 1, 1904, a third form of motor drive will be noted. In this case a 15 horse-power Thompson-Ryan motor is driving a Lodge & Shipley projectile lathe. Further comment on this outfit is hardly necessary aside from noting that the motor builders believe that too much spur gearing is used. In the present state of the art, machine tool designers are attempting to only slightly modify their standard patterns when using motor drive. According to the motor builders a radical change is necessary, and in the majority of cases the entire driving mechanism should be redesigned.

In any system of speed control it should be remembered that the size, weight and cost of the motor are dependent on the slowest speed at which the motor operates when developing its full rated power—that is, a 15 horse-power motor whose slowest speed is 500 revolutions per minute will weigh and cost as much as a 5 horse-power motor at 250 revolutions per minute.

This Thompson-Ryan motor is claimed to develop its full horse-power at all speeds, and the upper limit of speed at which any motor can be operated is dependent on the mechanical safety of the motor, the delicacy of its adjustment and the transmitting machinery.

To sum up, the Thompson-Ryan motor furnishes a method of speed control and variation which is exactly suited to the majority of problems arising in machine tool drive. The single voltage field control system has the great advantage of not requiring complicated or expensive controllers, and it is operated direct from the ordinary type of generator without auxiliary apparatus or complex wiring.

The Thompson-Ryan motor and controller is built in a large variety of horse-powers, ranging from 1 horse-power upward to any size desired, and in speed ratios from 2 to 1 up to 8 to 1. It is being put on the market by the Ridgway Dynamo & Engine Company of Ridgway, Pa.

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The deepest oil or gas well in the United States is said to be 5575 feet deep. To a depth of 40 feet a 10-inch casing was used; thence to 360 feet it was 8¼-inch; to 1320 feet, 6¼-inch, and thence to the bottom is a 6¼-inch hole. At a depth of 525 feet the temperature is 57 degrees F.; at 2250 feet it is 64 degrees; at 2400 feet, 78 degrees; at 5000 feet, 120 degrees, and at 5380 feet, 127 degrees; the increase being at the average rate of about 1 degree F. for every 70 feet.

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Investigations into the electric conductivity of the human body show singular variations in this conductivity due to the psychical or physiological condition of the subject of the experiment. The magnitude of the resistance was found to be sensitively dependent upon the hour of the day, the place of measurement, and even upon the character of the subject's last meal. A noise, or the presence or absence of other persons, has a marked effect. Any internal or external psychical influence will result instantly in an oscillation, often of great magnitude, in the value of the resistance, sometimes reducing it to as little as 20 or 30 per cent. of its normal value. Nervous persons and strong smokers and drinkers were found to have an exceedingly low resistance. The average value found for the resistance, as measured from hand to hand, was about 3000 ohms.

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## The Distribution of Shop Costs.*

The common form of making this distribution is to find from the previous year's accounts the sum of all the items that make up the burden, and after this has been determined to find the ratio between it and the sum of the direct labor for the same year; then for each dollar expended for direct labor add an amount sufficient to cover the burden in the form of a percentage. Such a method is in error for more reasons than one. In the first place, the percentage of burden has been fixed upon the results of the previous year's business and this results in an error which is perpetual. The percentage of burden fluctuates from year to year and from month to month. Your organization must be maintained through periods of business depression as well as in times when work is plenty. It is obvious that a percentage fixed as described can only take such conditions into account in an approximate way. The great shortcoming of the percentage method is that it totally ignores the time element. The burden properly chargeable against a given tool is twice as much for two hours as for one, and yet if a job were done to-day by a man earning 20 cents per hour and to-morrow by a boy earning 10 cents, the boy using the same machine but consuming twice the time, the amount of wages would be the same and hence the burden also. This is wrong, since the boy used the machine twice as long as the man, and the burden charged should be twice as long.

There are certain expenses incidental to the running of a manufacturing business which are clearly chargeable to the men and others to the machines. For example, heat and light are necessary for the man, while the power is consumed by the machines. All of these items are not so easy to divide. For example, the buildings are necessary for both men and machines, but there is a philosophy in all of this which enables a classification to be made of the burden and by this means to divide it into a man-hour burden and a machine-hour burden, and in this way distribute it on the product in a just and proper way.

The principal use of costs is to enable the manufacturer to properly figure on new work and to enter competition with a knowledge that the prices quoted are based upon stable information. What is more disturbing than to enter a competition for business at a price which you are sure is correct and then find that one of the competitors takes the business at a figure which is below your cost price. This is a result of one of the following causes: Either your cost accounting or that of your competitor is in error, or your shop practice is bad as compared with his.

Times arrive when business is slack and it is a desirable thing for the manufacturer to take work at a small margin of profit, or, perhaps, at exact cost, in order to preserve his organization. This cannot be intelligently done if his cost system is defective and does not properly record facts. The factors then which must be taken into consideration in connection with cost accounting are: 1, Material; this requires intelligent direction of purchase and receipt of materials, stores accounting and stores issue. 2, Labor; here proper safeguards must be provided against fraud on the part of the workmen; wage rates, both day and piece, must be properly accounted for and charged. 3, The burden or overhead charges must be properly collected and distributed on the product, thus showing costs at their proper level. Finally, the facts in connection with these three items must be carefully deduced, collected and combined, as the best guide for future action is the experience of the past.

* From a paper read by C. M. Lauer, Philadelphia, at the annual meeting of the Engine Builders' Association, New York, December, 1904.

# The Largest Coal Storage Plant in the World.

**The New Plant of the Philadelphia & Reading Coal & Iron Company Being Constructed at Abrams, Pa., by the Dodge Coal Storage Company. It Will Have a Capacity of about 500,000 Tons when Completed. Almost 15,000 Tons Can be Placed on the Piles Daily and 10,000 Tons Can be Reloaded on Cars in a Day of Ten Hours.**

## REGULARITY OF PRODUCTION THE MAIN OBJECT ATTAINED BY STORAGE.

Owing to the seasonable demand for anthracite coal the problem of storing it during the dull season in order to meet the demand when it is most active is an important one with the coal mining and hauling companies. In view of the fact that the great bulk of anthracite coal is used for domestic purposes, there is naturally a rush of orders during the late fall and winter season, while during the spring and summer the demand is comparatively slack. This condition not only taxes the mines beyond their capacity during the time of active demand, but it brings about a state of almost total stagnation at the mines during the dull period. The disadvantage of such an uneven state of affairs is apparent. It has not only been a source of great annoyance among the coal companies, but has also been the cause of much dissatisfaction and in many cases poor conditions among men in the mines. For a short time of the year they live on the fat of the land and are as busy as beavers. They lack foresight, however, and when the dull times come they are not only idle but in poor and often wretched circumstances.

The fluctuating demand, it will be seen, is therefore accountable for irregular conditions at the mines, which are not only antagonistic to the working organization but against the principles of economic production as well. Attempts to regulate the demand so as to spread it more evenly over the year have been made without any perceptible degree of success. At present, in fact, there is an agreement in force among the coal producing interests which strives to alleviate the conditions through the medium of prices. There is a gradual increase in the price of coal through this agreement extending over a period of several months, beginning with low prices in the dull season and terminating with much higher prices at the hight of the period when activity is greatest. This has failed to solve the problem.

The storage system has been found to be most effective, for it permits the continuous operation of the mines with a decreased force from one end of the year to the other. When trade is slack the coal simply goes to the piles and when the flood of orders comes the piles are simply drawn from to meet the exigencies of the occasion. The first important consideration, then, is the location of the storage plant. When the Philadelphia & Reading interests resolved to solve the problem on a gigantic scale with the storage system, this point was decided in favor of Abrams, Pa. This hamlet is located at a point in Montgomery County where a site could be obtained at low cost and where the conformation of the land would permit desirable switching and car storing facilities. At the same time, the location is within easy access of the mines, tidewater for shipping East and railway facilities reaching to the West, North and South.

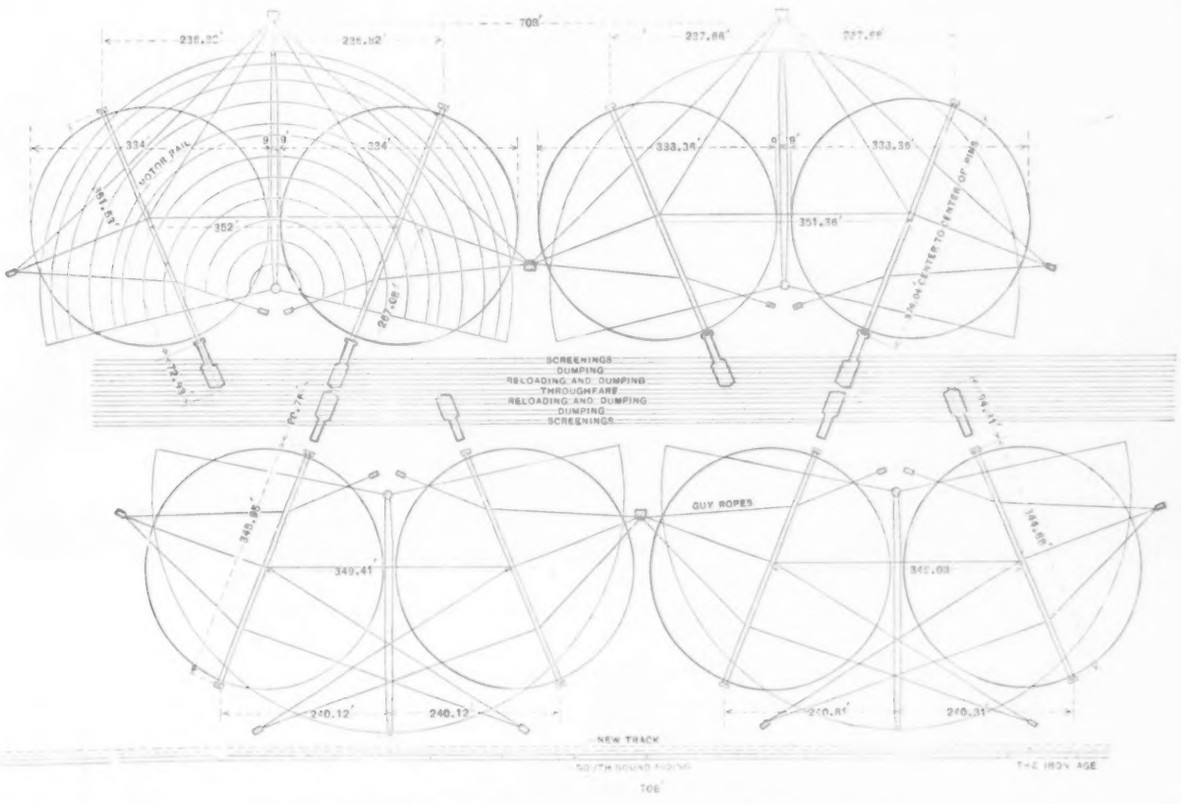


Fig. 1.—General Plan, Showing the Arrangement of the Abrams Plant.

The system decided upon was the "Dodge," which possesses two functions: The stacking on great piles or trimming out of coal to be stored, and the reloading from storage for further transport. Both operations are performed by continuous conveyors. For the former operation there is one conveyor for each pile and for the latter one serves each pair of piles. Incidentally, provision is made for screening the coal and for drilling cars by rope haulage.

The plant now in course of construction at Abrams is to consist, as shown in Fig. 1, of eight piles, each to have a capacity of at least 60,000 tons. They will be arranged four on each side of a central gravity track system as shown. The plant, both in capacity of storage and capacity of handling, is the largest ever installed by the Dodge Coal

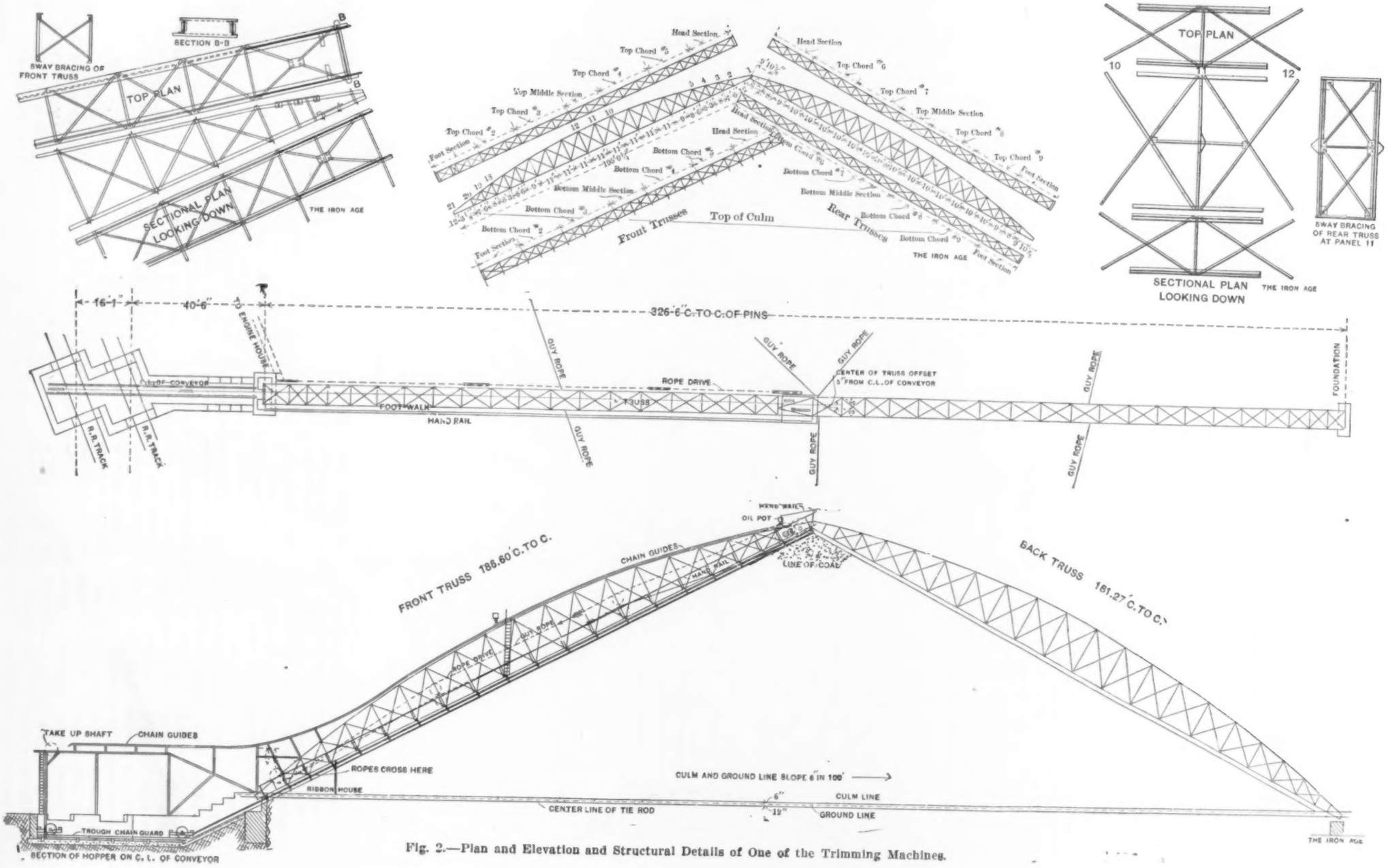


Fig. 2.—Plan and Elevation and Structural Details of One of the Trimming Machines.

Storage Company, which means that it is the largest ever installed. The problem of taking care by railway of the immense tonnage which a plant of this size will yield was an important one, and W. J. Richards, the general manager of the Philadelphia & Reading Coal & Iron Company, gave this subject a great deal of thought. As a result he has evolved a gravity system which, together with the great equipment of the plant itself, will furnish the most economical and rapid system for storing and handling coal ever devised, as well as the largest.

The guaranteed performance of the plant is 1800 tons per day of 10 hours for each of the eight incline conveyors, or a total stocking out capacity of 14,400 tons per day. For replacing the coal onto cars each of the four reloading conveyors will have a capacity of 2500 tons, making a total reloading capacity for the plant of 10,000 tons per day of 10 hours.

**Description of the System.**

In the operation of the Dodge system a chain conveyor supported by a sheer truss, constituting a trimming machine, is employed to stock out the coal, and a pivoted or swinging ground conveyor consisting of a flighted chain suitably mounted on a steel frame and actuated by power in all its movements, is employed for reloading the stocked coal into cars. The sheer truss of each trimming machine is arranged to span the pile to be formed, and is fixed at or about the natural angle of repose of the coal.

As usually arranged for open air storage on leveled ground, two trimming machines and one reloading machine located between them constitute a group, and the storage plant consists of the required number of these groups, which may be either of the same or of varied capacities. In the operation of the plant the coal received from cars in a hopper located beneath the receiving track is fed through a chute to the conveyor of the trimming machine, which delivers it upon the ground, or at the apex of the pile as it forms. The bottom of this conveyor is a steel ribbon, usually 12 inches wide, which is wound upon a drum located at the foot of the truss and arranged to be drawn out in grooves fixed in the conveyor trough so that its end, which is the only discharge point for the coal from the trimming machine, shall always be at the constantly rising and receding apex of the pile. With the trimmer building the pile up from the base in such a manner, the drop of the coal will not exceed 12 inches at any time throughout the entire operation. The breakage is thus reduced to the minimum. The reloading machine is composed of a horizontal and an inclined portion, both working together so as to render the carrying of the coal continuous from any point on the horizontal portion to the upper end of the inclined portion. Here a pocket is provided into which the coal flows, and from which it is discharged over shaking screens, and delivered into the cars. The horizontal portion of the reloader is pivoted at the foot of the incline, and provided with wheels, which run on circular tracks between and under the two heaps of the groups. The power mechanism of this apparatus is so arranged that one man on the operating platform handles the reloader with ease, taking coal automatically from the base of either of the two piles as may be required. In Fig. 8 the operator is shown at work manipulating this reloading machine. As the reloading from the base of the pile proceeds slides or avalanches are frequent. These would overflow or bury the reloader were it allowed to await them. The operator stands ready by a turn of the wheel to swing the reloader away from the pile until the slide ceases. Then with a reverse turn he brings the machine again into contact with the pile. The coal is delivered from the pivotal reloader through a hopper into the reloading incline, thence to the reloading tower for discharge into the cars for reshipment. The reloading tower is equipped with screenings hopper, adjustable shaking screens, reloading chute and operating machinery. The tower is built directly over the dumping tracks with the track containing the screenings car to its rear and the reloading car in front of it. This permits all of the dumping and reloading processes to progress simultaneously.

Fig. 3.—A Five-Pile Plant, Showing the Type of Trimming and Reloading Machines Which Are Being Constructed at Abrams.

**The General Lay Out.**

As the ground area on which the plant is located is not perfectly level, there being a difference of grade between the four floors, the dimensions of the 80 piles will vary slightly, the shear trusses being placed at different angles. The variations as to the total span of the trusses are shown in Fig. 1, but it will be observed that they range from 345 to 351 feet. In this figure it will also be noticed that the central track system is arranged in two sets, the tracks containing the screenings cars being located nearest the piles on each side, while the dumping tracks come next and the reloading tracks, which can also be used at times for dumping, are in the center of the system. In Fig. 1 the arrangement of guy lines is plainly shown, as is also the circular track upon which the reloading sweep travels. This feature is shown at the unit represented at the upper left hand corner of the engrav-

ing. The outer arc shown represents the extreme sweep of the reloader, which is 330 feet. A small amount of coal which does not come within the range of this radius must be shoveled over toward the center slightly in case it is desired to clean up the pile absolutely. This it is figured, however, will scarcely ever be necessary. The entire space occupied by the four floors or eight piles will be approximately 1400 feet x 1000 feet wide, with the end line running at an angle, as the arrangement of the units shows in Fig. 1.

**The Trimming Machines.**

In Fig. 2 the plan, elevation and structural details of one of the trimming machines are shown. The illustrations clearly demonstrate the character of the trusses, and the plan shows the location and angles at which the guy ropes are placed, as well as other details, such as the rope drive, foot walk, hand rail, &c. The structural details shown in the upper left hand corner represent typical sections of the end construction as used for the foot and head sections of the front truss. In the middle of

Fig. 4.—General View of One of the Trimming Machines, Showing the Flight Conveyor and How the Pile is Formed.

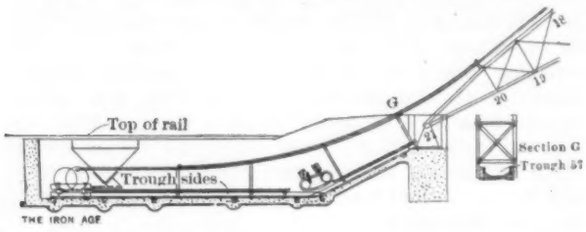


Fig. 5.—Details of Receiving End of Trimming Machine.

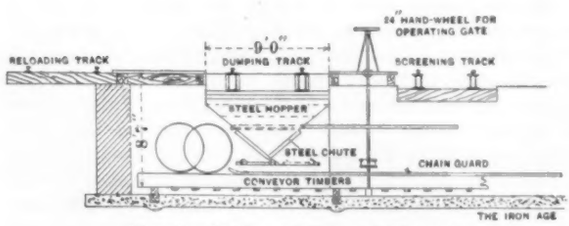


Fig. 6.—Section of Pit and Hopper.

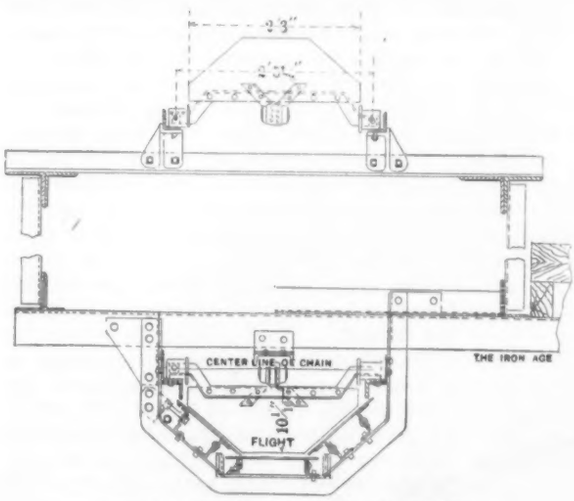


Fig. 7.—Details of Trough and Flights.

the top of the engraving the form of bracing used in the trusses is shown. Sections in the upper right hand corner illustrate the form of bracings used for the two center panels, and also the sway bracing, which is located exactly in the middle of the truss. A very light but strong form of construction is obtained by using tees and angles, the former being employed where greater rigidity is desired. Five-eighths-inch rivets are used in the center section, being placed in 11-16-inch holes, while at the end sections the rivets are ¾ inch in diameter with 13-16-inch holes. Where the principal members are joined together, particularly on the end sections, the holes are drilled with a steel jig, and slightly larger sized rivets are used. The sections at the extreme end are riveted complete in the shops. The illustration, Fig. 4, gives an excellent view of one of the trimming machines, showing the flight conveyor elevating the coal and on the top of the machine the conveyor on its return to the pit. The feature of forming the pile by depositing the coal upon its apex constantly as it increases in size, thereby eliminating any great fall of the coal, is clearly shown in this illustration.

A section of the receiving end of the trimming machine is shown in Fig. 5. In Fig. 6 a section of the pit and hopper shows the details of the dumping arrangement at this end of the system. It will be noted that the dumping track is located immediately above the steel hopper, which is opened and closed by means of a 24-inch hand wheel. The coal is discharged from this hopper into a steel chute, which delivers it to the conveying trough. The details of the trough and flights are shown in Fig. 7, the lower portion of the engraving showing the flight in the trough and the upper portion showing the flight in its inverted position on its return.

At the point, shown in Fig. 5, where the conveyor takes a horizontal position, a new form of chain depresser is used in lieu of a sprocket wheel. This is done in order to effect a saving of space, as it would be necessary to have a wheel 13 feet in diameter were a sprocket wheel used at the bend of the conveyor at this point.

The details of construction of this chain depresser are shown in Fig. 9. It will be noted that the principle of operation provides simply the use of another chain re-

Fig. 8.—General View of the Reloading Sweep.

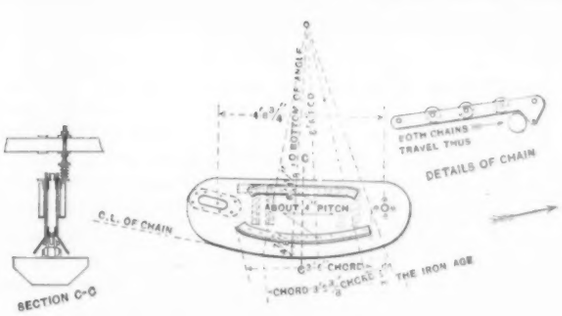


Fig. 9.—Details of the Chain Depresser.

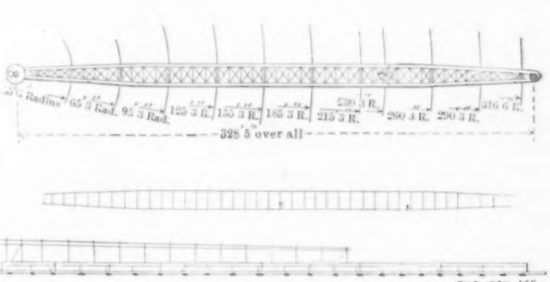


Fig. 10.—Details of the Reloading Sweep.

volving in the same direction with the conveyor chain being depressed, its curve of travel being the same as the radius of a 13-foot sprocket wheel over the distance which would be engaged with the main conveyor chain if one were used. This chain is of about 4-inch pitch, and angle iron guides are used to effect its travel in the proper curve. The pit is 8 feet 7 inches deep and runs back 10 feet from the center of the steel hopper. The hopper is built up of ¼-inch steel plates, as is also the chute. The rails of the dumping track are supported upon two 15-inch I-beams, weighing 80 pounds to the foot. The conveyor timbers are 4 x 12 inches and are supported on 6-inch timbers laid crosswise. The distance from the bottom of the timbers to the center of the conveyor is 2 feet 9 inches. This is also the distance from the bottom of the hopper to the bottom of the pit. The top of the hopper is 9 feet wide.

**The Reloading Machine.**

A view showing the operation of the reloading sweep is shown in Fig. 8, and the details of construction are shown in Fig. 10. It will be noted that the sweep is built up of structural shapes, and is strongly braced by means of cross and lateral bracings. It is placed on wheels which rest on the circular rails placed underneath and between the piles, and in the case of the Abrams plant will be swung about from one angle to another electrically. Traveling around the outside of the structural form it will be observed there is a continuous flight conveyor, which on its travel toward the pivot or stationary end is brought in contact with the edge of the coal pile, thus pulling the coal toward the incline, whence it is dropped into a hopper and elevated to the reloading tower. The length of each reloading sweep

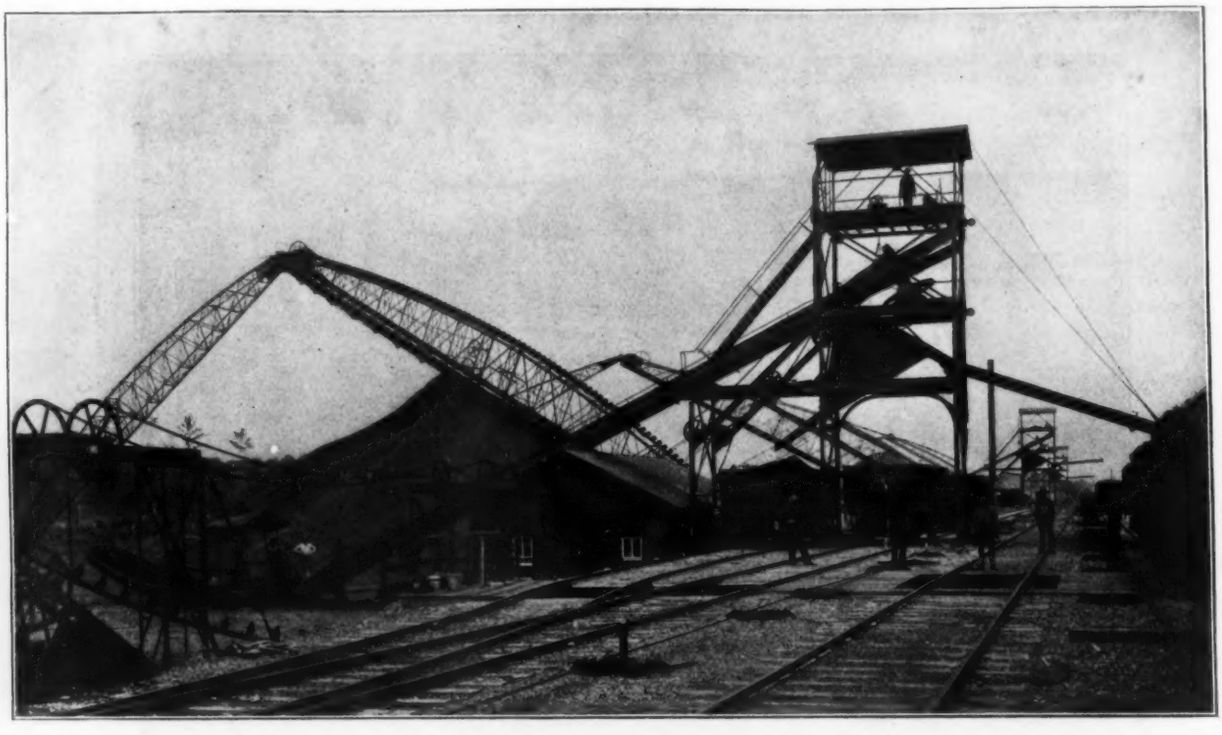

Fig. 11.—General View, Showing the Reloading Tower.

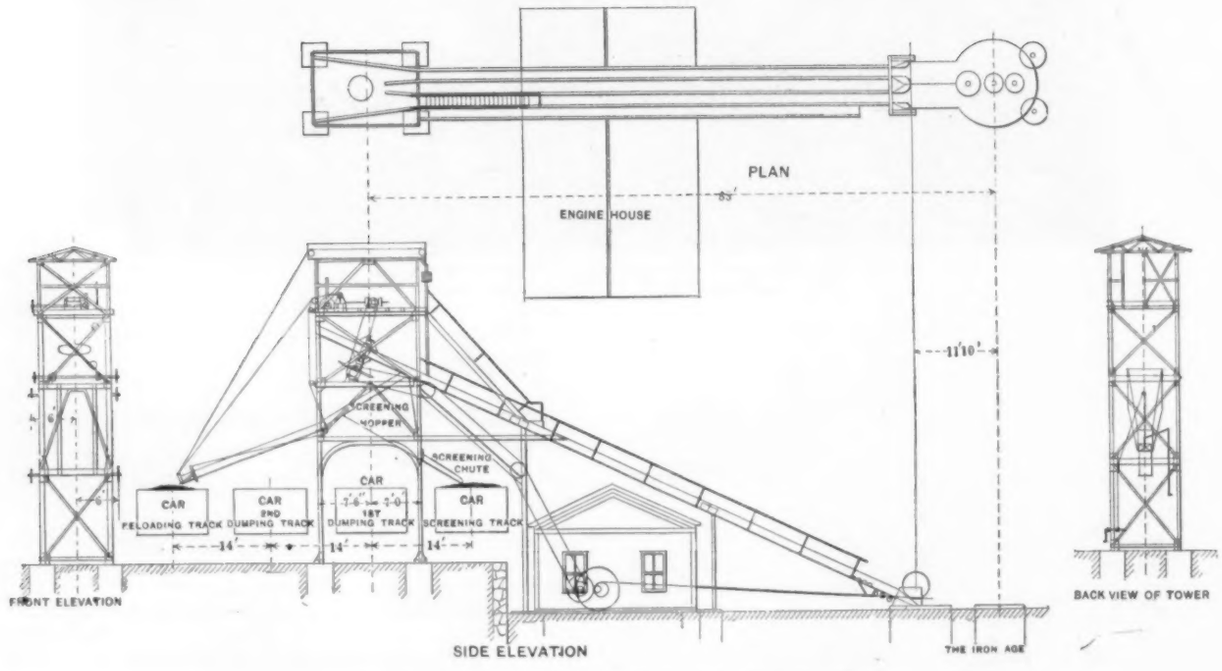


Fig. 12.—Plan and Elevation of the Reloading Tower.

is to be 328 feet 5 inches from the center of pivot to its extreme farther end. At its middle sections it will be about 10 feet wide, and it will be tapered to a width of 2 feet at each end. For cross bracing, 12-inch channels weighing 30 pounds per foot are placed at distances of 7½ feet apart, with the exception of the extreme ends where distances taper down to 2 feet 6 inches. The reloading tower and its incline are shown in Figs. 11 and 12. As will be noted in Fig. 12, the reloading tower is to contain adjustable shaking screens. By reference to Fig. 12 it will be noted an engine house is located underneath the incline which contains the power plant for driving all of the machinery of the reloading apparatus. This machinery is operated from the sweep platform for bringing the coal up to the reloading tower, and all of the apparatus of the reloading tower is controlled by the operator stationed at the top of the tower. It will be noted that the coal is delivered directly to the shaking screen, where it is separated from the screenings, the latter falling into a hopper, whence it is conveyed by chute to the car upon the screenings track. The screened coal is lowered by means of the hinged chute to the car upon the reloading track.

## The Coolgardie Water Supply.

The Coolgardie gold fields, which is a common name for the great groups of mines at Kalgoorlie and Coolgardie and the immediate neighborhood, are some 363 miles in a direct line from the port of Fremantle, on the west coast of Australia. The country is to all intents and purposes waterless, the average rainfall being 7.14 inches, and the evaporation 82.6, with a temperature often over 100 degrees F. in summer.

When the great rush of 1893 set in the want of water caused indescribable suffering and loss of life. The Government did all that was possible to minimize the suffering. It excavated tanks and built dams on the roads to the fields. In 1894 the railroad had been extended to the gold fields, *i. e.*, Coolgardie and Kalgoorlie. The difficulties and cost of working the traffic were enormously increased owing to the trouble in obtaining fresh water at almost any price. For example, the cost of water alone to the railroad department was $5000 per day during the summer. Such a state of affairs could not last. Various schemes were propounded, and at the latter end of 1895 it was announced that the Government intended to carry out a scheme for the supply of fresh water to the gold fields by means of pumping from the coast.

The late C. Y. O'Connor, engineer-in-chief, after months of work and inquiry, in July, 1896, reported in favor of a scheme which consisted of a reservoir to be built on the Helena River, near Mundaring, in the Darling ranges, about 20 miles from Perth, the water to be then pumped through a main to Coolgardie. In the first place only 1,000,000 gallons was estimated as the probable requirement. This quantity was, however, increased to 5,600,000 gallons per 24 hours, and the estimated cost was set down at $12,500,000, exclusive of the reticulation of the towns en route. The necessary money was given by the Government, and the following plan of the works was carried to completion:

The main supply reservoir is situated in the Darling ranges, about 30 miles from Perth, 320 feet above sea level, where two great arms of granite jut out across the narrow valley, at the bottom of which flows the Helena River. A gigantic dam of concrete is placed like a huge wedge between the two granite arms, thus closing up one end of the valley. It is 760 feet long and 100 feet high in the deepest part, and the foundations were carried down nearly 100 feet below the level of the river. The reservoir, or lake, thus formed is eight miles long and contains when full 4,600,000,000 gallons of water. Suitable valve towers are provided to regulate the flow to the first pumping station. The problem was to pump 5,600,000 gallons of water per 24 hours, against a total estimated head, including friction, of 2700 feet, through a pipe 30 inches in diameter, and, roughly, 330 miles in length. There were erected eight stations between the river and the gold fields. All the work of pumping is done by the horizontal high duty duplex direct acting Worthington machine, which delivered on the test 3,147,559 gallons per 12 hours, or much in excess of the 2,800,000 required in that time.

## Exhaust Steam Turbines in Steel Works.

It is now a good many years since Druitt Halpin proposed a system of thermal storage for rendering available for power purposes steam produced at times when it could not be immediately utilized. The proposal as made had special reference to reducing the boiler capacity needed to carry the load on an electrical station at the time of maximum demand. The principle is, however, available in other circumstances, and in a paper read before the West of Scotland Iron and Steel Institute P. J. Mitchell described the plant by which Professor Rateau has rendered available the very large quantities of exhaust steam now wasted at large collieries and iron works. It should be noted that it is more economical to use this steam in a turbine than it is to merely fit the engines with a condenser, since, when it comes to dealing with steam at low pressures, the very best reciprocating engine is easily distanced by even an inefficient turbine. The difficulty to be met lies, however, in the fact that at rolling mills and steel works the supply of exhaust steam is very fluctuating, and although the waste may represent 1500 horse-power or more, some method of thermal storage is essential if this is to be commercially available, as the demand for power is a constant and not a fluctuating one, or at least such fluctuations as exist cannot be expected to synchronize with those in the supply of exhaust steam. Three patterns of thermal stores,* or regulators, are used by Professor Rateau.* In the one case the regulator consists of a large vessel filled with cast iron trays containing water, in which is stored up the surplus energy received at times of large supply of exhaust steam, to be evaporated off again at times when this is deficient, so that a supply which is practically steady is supplied to the turbine. In another pattern the vessel is filled with masses of scrap iron. In both these cases the large quantity of metal present greatly facilitates the rapid interchange of heat. In the third pattern the heat is stored in water, as in the Druitt Halpin system, but to insure a rapid interchange of heat between the steam and the water the exhaust steam is introduced below the surface of the latter, into which it escapes by a series of small orifices so arranged that the water is kept in a state of constant agitation. With a steam supply at 29.4 pounds absolute per square inch and a vacuum of 25 inches the consumption in the turbine per electrical horse-power is only 20.1 pounds, while with steam at 14.7 pounds absolute and the same vacuum it is 26.5 pounds per electrical horse-power hour.—*Engineering.*

The world's record for total mileage covered by a single locomotive is held by No. 955, known as the Charles Dickens, of the London & Northwestern Railway, England. It was put into service in February, 1882, on the express run between London and Manchester, where it has ever since remained, and recently completed 2,100,000 miles. The cylinders are 17 x 24 inches, the drivers are 78 inches and the steam pressure carried is 150 pounds. It is estimated that for 2,000,000 miles it used 27,486 tons of coal and 204,771 tons of water, and that its average maintenance cost has been only 3.56 cents per mile.

According to a recent investigation into what constitutes a good coal it should contain about 20 per cent. of volatile matter and not more than 6 to 8 per cent. of ash. The tests were conducted by M. Saillard in the laboratory of a syndicate of French sugar refiners. An account of the tests in *l'Industrie* states that analyses were made of 350 samples of coal furnished by 44 French, Belgian, German and English mines.

* A description of the Rateau accumulator was printed in *The Iron Age* of June 2, 1904, in an abstract of a paper presented by Professor Rateau before the American Society of Mechanical Engineers.

# A Modern Engine Building Plant.

## WORKS OF THE WILLIAM TOD COMPANY, YOUNGSTOWN, OHIO.

One of the largest plants in the country devoted to the manufacture of engines and heavy rolling mill machinery is that of the William Tod Company, Youngstown, Ohio. The original plant, which was a small one, was built in Youngstown in 1856. In 1901 the company was incorporated and the plant was very much enlarged and equipped with modern and special tools, so that for excellence in shop practice and completeness of facilities for engine building and the manufacture of heavy machinery it is one of the most complete and modern plants in the country. The plant occupies about ten acres lying between the tracks of the Pennsylvania and Erie railroads on one side and the Baltimore & Ohio on the other, where it is well situated for receiving material and shipping finished products. The importance of this is appreciated when one considers that in the manufacture of heavy machinery much depends upon the economical transferring and handling of the heavy parts.

Fig. 1.—Interior View of the Foundry.

The yard arrangement and the disposition of the various parts of the plant are shown in the plan, Fig. 2, which indicates in a measure the convenience for handling work. The transferring of material between the shops and the shifting of cars in the yards is done by a 30-ton locomotive crane furnished by the Industrial Works, Bay City, Mich. This crane makes the space between the tracks in the receiving yard available for storage purposes. The tracks in the receiving yard are used also when making up shipments. A running track leading from the main lines of the railroads has spurs leading into all of the shops, extending under the cranes, and another extends into the iron yard, which lies between the receiving track and the foundry. All cars entering or leaving the works or being transferred from the foundry to the machine shop pass over a 150-ton Fairbanks track scale.

### The Foundry.

The main building of the foundry is 125 feet wide by 250 feet long and is of brick and structural steel. It is well lighted and ventilated through skylights and windows and is heated by an indirect system, the warm air being carried through a brick underground conduit and delivered from stand pipes at two points in the building. A 10-foot fan, manufactured by Wm. Bayley & Sons Co., Milwaukee, Wis., supplies sufficient air to completely change the contents of the building every 20 minutes. The main part of the foundry, shown in Fig. 1, is served by two 35-ton electric traveling cranes. These have a span of 80 feet, serving the whole of the shop, and are equipped with 5-ton auxiliary hoists. The runway extends 150 feet to cover the yard where castings are cleaned and loam plates, large flasks and castings stored. In addition there are two 10-ton cranes of 40-foot span, which operate on runways below the larger cranes and extend over about one-half of the foundry where the green sand work is done. By this arrangement the larger cranes may be used for any specially heavy work in this end of the shop, although ordinarily the 10-ton cranes are sufficient. All of these cranes were furnished by the Morgan Engineering Company, Alliance, Ohio.

The cupolas, sand bins, stockrooms, lavatory and power plant occupy a wing of the main building 40 feet wide and extending its full length. The cupolas, of which there are three, were built, one by the Whiting Foundry Equipment Company, Harvey, Ill.; another by the Northern Engineering Company, Detroit, Mich., while the third is of the company's own make. They have a total melting capacity of 40 tons per hour. Beyond the cupolas is the coreroom, which is equipped with a 5-ton electric crane from the Northern Engineering Company, and transfer cars, by which cores are delivered to the foundry cranes as needed. Two large ovens, furnishing ample drying provisions for this department, are located outside of the building proper, but open into the coreroom, so that crane service is afforded. The ovens for drying loam work occupy a corresponding position at the end of the main building. Any loam or dry sand molds too large

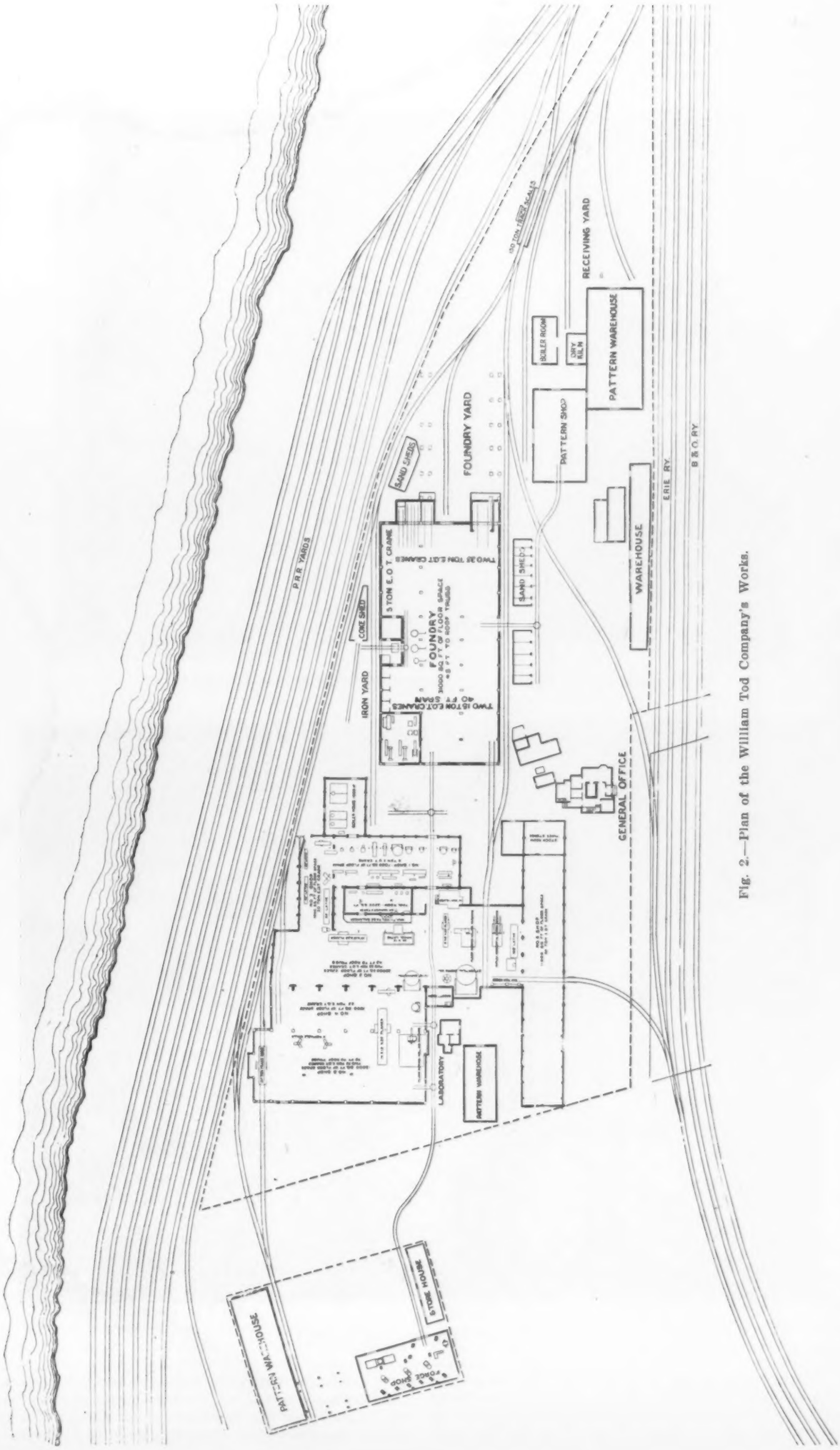


Fig. 2.—Plan of the William Tod Company's Works.

for the ovens are dried by natural gas, the whole foundry being piped for natural gas and also for compressed air. The compressed air is supplied by a Laidlaw-Dunn-Gordon compressor and is used for a number of pneumatic rammers and for hammers in the cleaning yard.

charge several small flat cars are used, one for each part of the charge. These are run out of the foundry one at a time to a transfer car traveling on a sunken track which extends lengthwise of the iron yard. The transfer car is then rolled to the coke shed or that part of the

Fig. 3.—View of the Charging Floor, Showing the Continuous Track for the Cars.

Fig. 4.—General View of the Large Tool Shop, No. 3.

The procedure in making up the charges in the cupolas is an interesting one, as it provides an easy and accurate way for proportioning the components of the mixture to produce castings of excellent uniformity. For each

yard containing the grade of iron wanted. It carries a platform scale having six beams, each set at the proper weight for one of the ingredients of the charge. The use of this car relieves the laborers in the yard of any cleri-

cal work in weighing, has resulted in a more accurate fulfillment of chemical specifications and enables the keeping of a reliable running inventory of metal stock. When the flat car is loaded it is returned to the foundry and raised on an electric hoist to the charging floor, where it forms one of a train for a single cupola charge. The view of the charging floor in Fig. 3 shows how the charge trains are made up at the right and are passed around the loop in the background and brought alongside of the charging openings in the cupolas. After the cars are emptied, the track being continuous, they are passed forward until they come around again to the hoist.

Opposite the foundry are a number of brick buildings accommodating a pattern shop, dry kilns, flask shop and pattern warehouses. The pattern shop occupies the second floor over the flask shop and pattern keepers' floor and is 56 x 110 feet. It is equipped with modern tools and all the facilities necessary for this department. The warehouse is a practically fire proof building, and together with the other pattern warehouses affords 48,273 square feet of floor space for storing patterns.

The power plant in one end of the wing of the foundry contains two 250-kw. generators, one made by the Bullock Electric Company and one by the Sprague Electric Company. Each is direct connected to a tandem compound Porter-Hamilton engine, of which the William Tod Company is the builder. The air compressor previously mentioned and the pressure blowers for the foundry are in this room. The power for the whole plant is furnished by the engine generator sets, as all machine tools are motor driven, in many cases individually, while the smaller tools are group driven from short line shafts. Variable speed is obtained by supplying the motors on a Bullock multiple voltage system with voltages ranging from 40 to 225. The balancer for the multiple voltage system is placed in the toolroom in the machine shop, where it is more centrally located. The boiler house adjoins one end of the machine shop building and contains

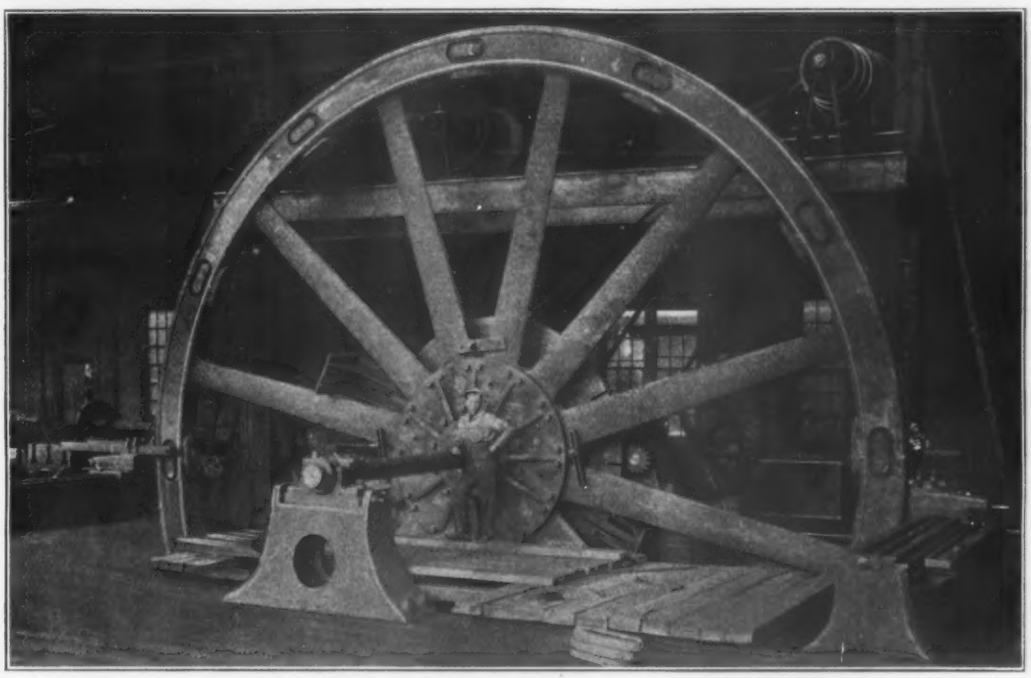

Fig. 5.—The Large Pit Lathe Turning a Segmental Fly Wheel 32 Feet in Diameter.

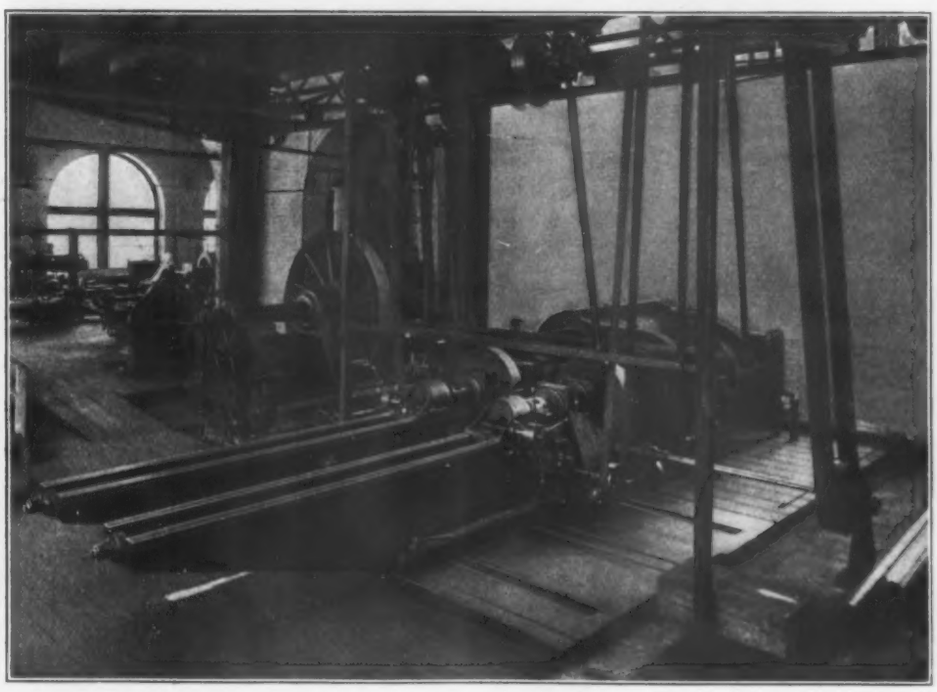

Fig. 6.—A Duplex Horizontal Boring Machine, Built by the Meadville Vise Company.

500 horse-power of Geary water tube boilers, built by the Oil City Boiler Works, Oil City, Pa., and 500 horse-power of Heine water tube boilers, built by the Heine Safety Boiler Company, St. Louis, Mo.

**The Machine and Erecting Shops.**

The greater part of the floor space in the toolroom is occupied by racks for tools, appliances and blue prints which are issued on checks. The small tool shop, known as No. 1, is on the west side of the toolroom, and is served by a 5-ton electric traveling crane, built by Pawling & Harnischfeger, Milwaukee, Wis. The tools in this shop are group driven and include lathes from 20 to 36 inch swing, boring mills from 42 inches to 10 feet, slotters, turret lathes, milling machines, &c.

At right angles to this shop is the No. 2 shop, which contains lathes from 36 to 60 inch swing and a universal grinding machine. It is served by a 15-ton Shaw crane on a runway above the crane in No. 1 shop, so that heavy pieces may be easily transferred. This crane runway, in turn extends under the crane runway in the large tool shop, No. 3, which is parallel to No. 1, and has 23,000 square feet of floor space covered by two 35-ton cranes, one made by the Morgan Engineering Works and the other by Pawling & Harnischfeger. A general view of the No. 3 shop is given in Fig. 4. A portion of the floor is used for erecting, but the greater part is taken up with large machines, including a 27-foot Niles vertical boring mill, 110-inch lathe, 35 x 12 foot pit lathe (Fig. 5), 10 x 10 x 25 and 8 x 8 x 25 foot Pond planers, 500-ton wheel press, horizontal and vertical boring mills, and a special horizontal duplex mill. The last was made by the Meadville Vise Company, Meadville, Pa., and is shown in Fig. 6. It is arranged at one setting to bore and face the cylinder barrel and the piston valve ports of a piston valve cylinder, insuring perfect alignment. It is also used for boring and facing the ports of a Corliss cylinder, and has handled cylinders 110 inches in diameter. In an annex to this shop there is a babbitt room equipped with two furnaces and ladles of 2 tons capacity and an overhead traveling crane. Here all bearings are babbitted with metal specially selected for the service required and carefully analyzed and tested.

Parallel to this shop is the large erecting room, having 21,000 square feet of floor space. One part, known as the No. 4 shop, is served by a 10-ton crane, built by the Youngstown Engineering Company, Youngstown, Ohio, and the other part, the No. 6 shop, is served by two cranes of 75 tons capacity each, with 15-ton auxiliary hoists, built by the Browning Engineering Company, Cleveland, Ohio. The shop is 72 feet to the bottom of roof truss, or 60 feet under the crane, making it possible to erect very high vertical engines. Fig. 7 shows a tandem compound quarter crank blowing engine for Cia Fundidora de Fierro y Acero de Monterey in process of erection. The view is especially interesting as showing the amount of light in the erecting shop. The end of this building is of temporary construction, being arranged for future extension, when it will be made double its present length.

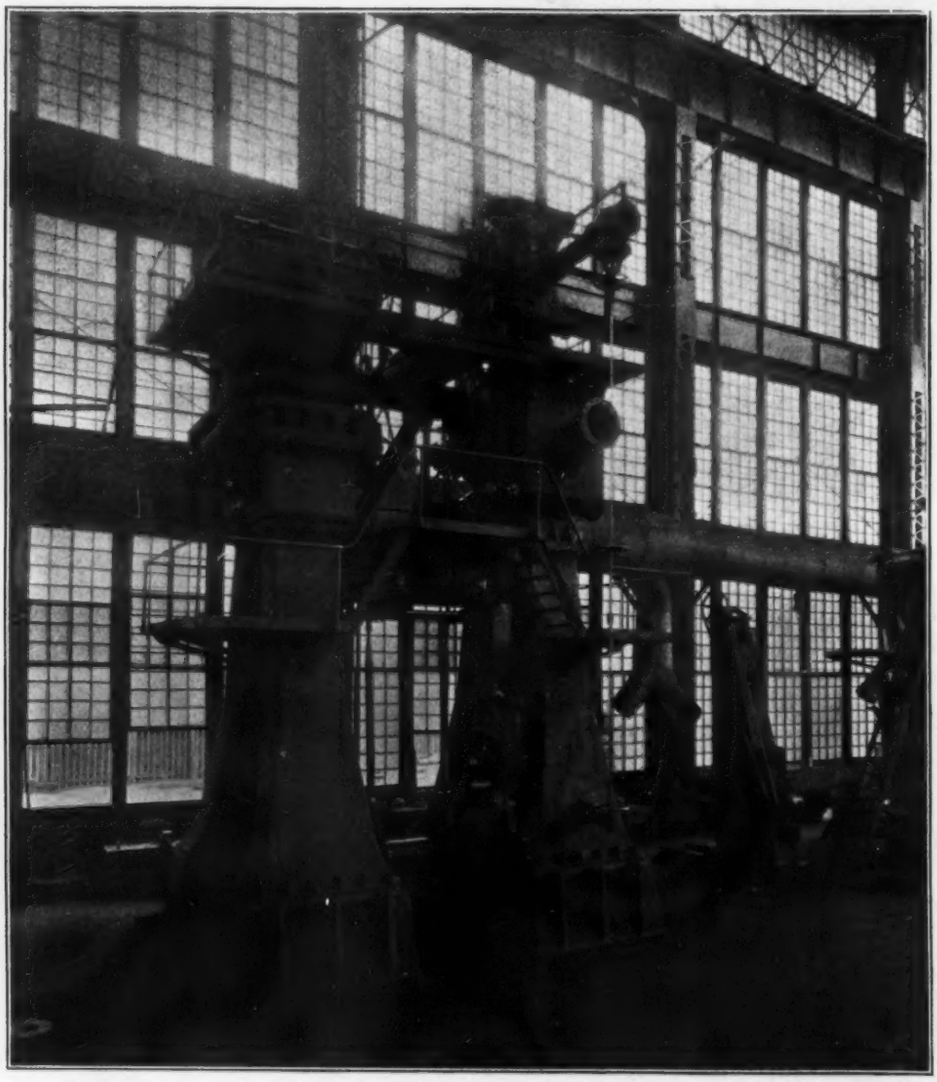

Fig. 7.—A View in the Erecting Shop, Showing the Hight of the Crane Runways and the Ample Lighting.

This shop also contains a Pond planer, one of the largest ever built, being 14 feet between housings and 12 feet under the rail, with 30 feet travel of the bed. The machine, as shown in Fig. 8, is of very heavy design and is driven by a 50 horse-power direct connected motor. The same view shows a floor boring machine purchased from William Sellers & Co., Incorporated, Philadelphia, Pa. This machine is very heavy and rigid, having a 10-inch spindle and a 6-foot stroke, with a 9-foot vertical and a 22-foot horizontal travel. It is driven by a 25 horse-power motor. Fig. 9 is a gen-

eral view of the erecting shop, and shows a large reversing rolling mill engine under construction.

The No. 6 shop, at right angles to the other shops, is used for the erection of the smaller horizontal engines, and is served by a 30-ton Morgan traveling crane. One end of this building is a storeroom, having 4200 square feet for the storing of merchandise and stock parts.

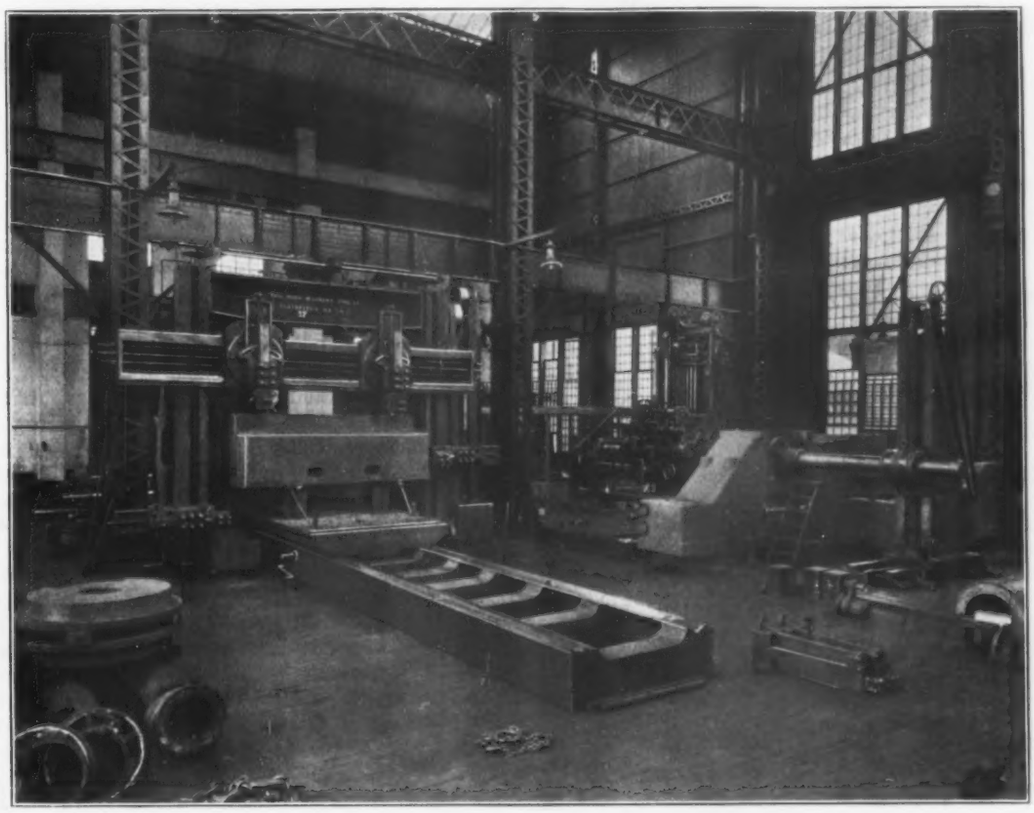

Fig. 8.—View in the Erecting Shop, Showing a Pond Planer, One of the Largest Ever Built, and a Sellers Heavy Floor Boring Machine.

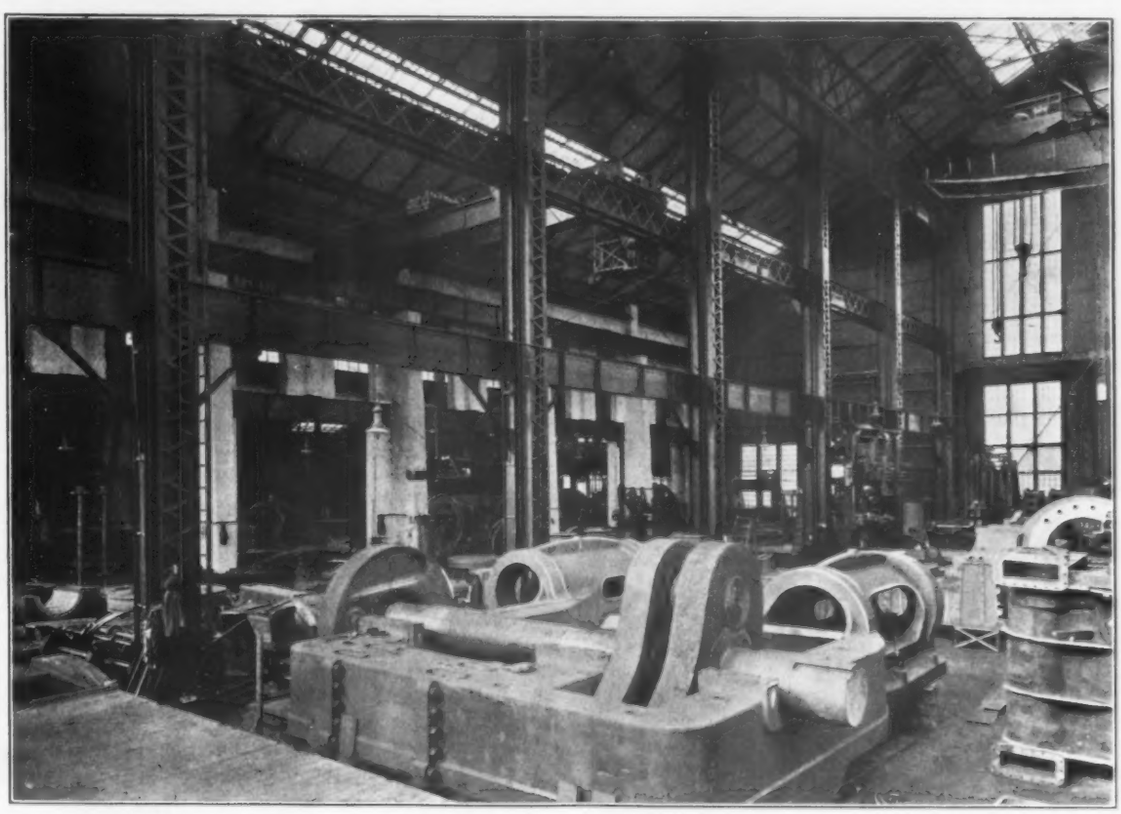

Fig. 9.—General View of the Erecting Shop, Showing a Reversing Engine in the Foreground.

**The Forge Shop.**

The forge shop is separate from the other buildings and is well equipped, having besides the jib cranes serving the hammers a 10-ton Whiting electric traveling crane. It contains three steam hammers of 4000, 3000 and 800 pounds capacity, respectively. The shop has a hammer and furnace capacity for making forgings as

large as 18 inches in diameter and weighing 10 tons. The hammers were furnished by William Sellers & Co. and the Chambersburg Engineering Company, Chambersburg, Pa., and the blowers and down draft forges by the Buffalo Forge Company, Buffalo, N. Y. At the end of the building there is a swinging door and a crane runway extension, allowing the crane to travel over the stock of iron and the railroad tracks.

In every department the plant is not only well arranged and equipped for making very heavy and large work, but for producing work of an excellent quality of workmanship.

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# The Pittsburgh Iron Trade in 1904.

BY ROBERT A. WALKER, PITTSBURGH, PA.

### General Features.

In comparison with the years 1900-1903 the year 1904 in the iron trade does not show up very favorably. The year opened with a fair demand for iron and steel products, but with prices ruling comparatively low. The last three or four months of 1903 had seen a falling off in the demand for all kinds of material and a general leveling in prices. This continued during practically all of 1904, until September, when a general improvement in the iron trade started and steadily gathered force, the close of the year finding a radical change in conditions from those which prevailed at its opening. In fact, there was probably almost as much tonnage booked by the mills in the last four months of 1904 as in the previous eight months, while the average of prices was considerably higher.

Confidence seemed to be lacking when the year opened, and predictions were made that it would be a lean year in the iron trade, with a steadily declining market. The railroads had been heavy purchasers of material for two or three years, and the condition of their equipment was such that they could stay out of the market as buyers of iron and steel, which they did until the latter part of the year. The money situation was unfavorable, railroads and other large interests being unable to float loans except at very high rates of interest for the purpose of securing money to buy equipment. The business depression was severely felt by leading iron and steel concerns, and, while failures were few, many of the large interests were running close to shore in the matter of expenses, and in a number of cases dividends were passed by companies who found they were unable to earn sufficient money to meet fixed charges, even with dividends passed. Plans that had been prepared for large additions to plants were put aside until more favorable conditions should come, and the amount of new construction during 1904 was very much less than usual.

In spite of the great depression felt during the first eight months of 1904 prices were held pretty well under control and the market was comparatively free from the violent fluctuations that marked it some years ago before the steel trade was in the control of the large interests which now have such an important influence upon it. It is true that reductions in prices were made during the early part of the year, but these were made to meet existing conditions and at no time during the year was there utter demoralization in the market. It has been truthfully said that in 1904 the United States Steel Corporation passed through the worst year in its history from every standpoint, and this being true of this great interest, it naturally follows that it is also true of all other leading iron and steel concerns. It is a matter of congratulation that the corporation, in spite of the adverse conditions existing, was able to maintain and pay regular dividends upon its preferred stock and at the same time keep up and improve the physical condition of its plants. That the control of the market by large interests is beneficial was demonstrated during 1904, for had it not been for this control we would undoubtedly have had some record breaking prices, especially during the summer months, when all the mills were keen for tonnage, which was sadly lacking at this time.

The year 1904 in the matter of profits will probably not compare favorably with 1903, which was only fair in this respect. Had it not been for the general improvement in business which came during the last four months of 1904 it is not unlikely that many concerns would have closed the year about even, or possibly with a balance on the wrong side of the ledger.

### The General Outlook.

The outlook for 1905, viewed from the conditions which existed up to September of the year just closed, is very satisfactory, and every confidence is felt that the new year is going to be one of the best the iron trade has ever witnessed. General conditions are most favorable and there is not a sign apparent anywhere that would lead to the belief that the iron trade can have any serious setback in the new year. Crops during 1904 were abnormally large, and the farmers have been able to find a ready market for their products, and at highly profitable prices. The railroads have all the tonnage they can possibly handle and are really handicapped for sufficient motive power. The political situation has been disposed of for four years, while money conditions are most favorable. Labor has shared in the prosperity which has come in the last three or four months and is more fully employed than at any time for nearly two years. Sentiment is altogether favorable, and this cuts no small figure in the business world. The railroads in the last two or three months of 1904 have come in the market and placed large orders for steel cars, engines and other equipment, and promise to be very heavy buyers of steel rails during 1905, and of other equipment as well. It is conceded that the railroads are the largest customers for iron and steel products, and when they are buying liberally the general trade is usually in satisfactory condition.

The last three months of 1904 were marked by successive advances in prices of pig iron, steel billets, plates, structural steel, wire, tin plate, sheets, bars and other forms of finished products. It is a well-known fact that consumers will buy on a rising market, but never on a falling market. The truth of this was fully demonstrated in the closing three months of 1904, when the tonnage placed for all kinds of iron and steel products was abnormally heavy, resulting in the starting up of plants, some of which had been idle for a year to eighteen months. No better evidence of the improved conditions that marked the iron trade in the last three months of the year and of the splendid outlook for 1905 can be found than is given by the action of the Carnegie Steel Company in starting up practically all of its idle blast furnaces and steel works, and by the American Sheet & Tin Plate Company, National Tube Company and other large interests in getting idle plants started to meet the heavy demand that has come upon these concerns for their products. For the first time in more than eighteen months the Carnegie Steel Company is operating in full all its steel plants, and by January 15 will have in operation its maximum blast furnace capacity. The finishing mills operated by this great concern are in full operation, with a tonnage booked ahead for two or three months. The same condition applies to other large interests, and the outlook for 1905 could hardly be more favorable.

That it will be the policy of the large interests to control the market as much as possible and prevent any wild fluctuations in prices, or unreasonable advances, can be expected in view of their action in the past. It is recognized that a conservative market with fair prices is the best for all concerned, and to maintain this will no doubt be the first efforts of all connected with the trade. The reaffirming of prices on steel rails for 1905

delivery and the placing of large orders by the Pennsylvania and other leading railroads can be taken as a general indication of what may be expected in the rail trade for 1905, which is probably the most important branch of the whole steel business.

**New Construction.**

The first eight months of 1904 were probably the quietest in the matter of new construction that the trade has ever known. Owing to the general business depression and the tightness of the money market, together with the unfavorable outlook, plans made by the leading interests for the building of new plants and additions to present works were laid aside to await more favorable conditions, the result of this being that the amount of new work under way in the first six or eight months of the year was pitifully small. Many leading engineers had reduced their forces to a minimum and were practically without any important work. The United States Steel Corporation went steadily ahead with its improvements at McKeesport and the new tube mill at Lorain, but aside from this very little work was under way.

When the revival in business came along in September some of the plans that had been put aside at the first of the year were taken up, and new work started with a vim that was highly pleasing. The most important new construction undertaken during 1904 was the remodeling of the National Tube Works of the National Tube Company, and which is still uncompleted. This included the adding of a third converter to the Bessemer plant, the building of a new blast furnace, and a general remodeling of the plant. At Lorain, Ohio, the same company has had under way for more than a year the building of what will be the largest and most complete tube mill in the world. The new work under erection at Lorain includes the building of two large blast furnaces, each to be 85 x 22 feet, and to be equipped with 4 Cowper fire brick stoves, 120 x 21 feet, and to have a total annual capacity of 300,000 tons of Bessemer iron. The tube mill will contain 4 lap weld and 5 butt weld furnaces, the plant to roll pipe from ⅛ inch in diameter up to 20 inches, and to have a daily capacity of at least 1000 tons. The National Tube Company expects to start one of its large furnaces at Lorain very early in January.

The Carnegie Steel Company has fully maintained the usual high physical condition of its works, and has also built some new work. Included in this are two furnaces at South Sharon, which were completed during 1904 and which are now in operation; also a fourth blast furnace at Youngstown, which is running, and a fourth new stack at New Castle, which was started early in December. The company has also completed the third blast furnace at the Clairton plant, which it acquired in 1904, and has finished the building of the Donora blast furnaces and open hearth steel plant, which it acquired by purchase of the Union Steel Company. Neither of the blast furnaces nor the open hearth steel plant at Donora has yet been operated, but preparations are now under way to start the blast furnaces, and as soon as these are running the steel plant will also be operated.

In the Youngstown district very little new work aside from the new blast furnace of the Carnegie Company has been undertaken this year. In November the Youngstown Iron Sheet & Tube Company decided to add new skelp and pipe mills to its plant, and these are now under way. The Republic Iron & Steel Company placed contracts in October for a new mill to be built at its Bessemer plant at Youngstown, and which will roll sheet or tin bars and steel rails. The contract for this mill was placed with the United Engineering & Foundry Company, Pittsburgh. It will not be ready for operation before June.

In the Wheeling district important improvements were made at the Riverside department of the National Tube Company, while the La Belle Iron Works at Steubenville, Ohio, completed the building of a new blast furnace, which is now in operation, and early in December placed contracts for the building of an 84-inch plate mill. Plans are under way by some of the leading interests for material additions to present works and the outlook for construction during 1905 is very much more favorable than at the coming of 1904. Large builders of rolling mill machinery in the Pittsburgh district, such as Mackintosh, Hemphill & Co., United Engineering & Foundry Company, Mesta Machine Company and others received some very important contracts in December and are operating their shops to nearly full capacity.

**Foreign Trade.**

Severe business depression in the first eight months of 1904 made it necessary for the leading interests to look to foreign markets to dispose of their products. For this reason the foreign trade of the United States Steel Corporation and other leading interests was very much larger in 1904 than in the previous year. While foreign trade is desirable to cultivate in periods of severe depression, as it provides an outlet for surplus product, yet at the same time it has a disadvantage in the fact that very low prices are usually made for material for export, and which allow little profit. The Carnegie Steel Company during the year exported a very large tonnage of steel rails, billets, sheet and tin bars, but most of the tonnage was sold at low prices. The Eastern war between Russia and Japan was also responsible for the placing of heavy contracts for iron and steel products in this country that otherwise we would not have had.

The American Steel & Wire Company made large shipments of wire nails to Japan, the Shelby Steel Tube Company filled heavy orders for seamless tubes and the American Sheet & Tin Plate Company filled large orders for tin plate for Japan. This trade was in addition to the usual export trade of these companies. Should the domestic demand for the year 1905 be large enough to take the product of the mills, it is probable that the foreign trade will show a very material falling off. That the United States Steel Corporation expected to find it necessary to market a considerable part of its products abroad was evidenced by the fact that early in 1904 the United States Steel Products Export Company was organized, which is known as the exporting end of the Steel Corporation. This new interest went after foreign trade aggressively and secured some very heavy contracts.

**Price Agreements.**

During 1904 the price agreements in the rail, billet, structural steel, plate and steel bar trades have been maintained and have been very beneficial to these branches of the trade. There was a time during the summer months when the Billet Association was disorganized, this being brought about by the placing of a large conversion contract for billets with the Republic Iron & Steel Company by the Pittsburgh Steel Company, which amounted to over 100,000 tons. The contention was made that the Republic Iron & Steel Company had violated the terms of the billet agreement in making such a contract, but the Republic Company maintained its position, and after some stormy sessions of the association held in New York the billet agreement was renewed and is still in force. The rail agreement, which has been fairly satisfactory to its members, has been renewed for 1905, satisfactory arrangements having been made with the Lackawanna Steel Company for its percentage of the rail trade. The structural steel plate and steel bar agreements had much to do with steadying the market during the severe depression. The price agreements in force during 1904 have been renewed for 1905 and will no doubt continue to have the same general beneficial effect on the branches of trade they represent as they have had for the past several years.

**Labor Troubles.**

The year was comparatively free from labor troubles. In March the tin plate trade was extremely dull, and several reductions in prices had been made. This necessitated a reduction in prices for tin plate labor, and after a number of conferences between the American Sheet & Tin Plate Company and the independent mills with the Amalgamated Association the tin workers agreed to accept a cut in wages of about 18 per cent. and the sheet mill workers of about 15 per cent.

In June the Carnegie Steel Company notified the Amalgamated Association that a material reduction would be necessary in the wages of high-priced labor at its hoop mills in the Youngstown, Ohio, district. A number

of conferences were held between officials of the association and the Company for the purpose of settling the trouble, if possible without a strike, but this was not successful. The result was that the association declared a strike at the hoop mills of the company in the Youngstown district. This was bitterly fought for three or four months, but resulted in the company being able to fill the mills with a complement of skilled labor, and about September the hoop mills at Warren and Youngstown were in full operation and on a nonunion basis. The Girard plant of the company has been practically abandoned, and the best part of the equipment removed to the Youngstown mills.

Aside from the above there were no labor troubles in the Pittsburgh district during the year, and while labor in the first six or eight months of the year was not fully employed, and in many cases at a lower rate of wage, the close of the year found the mills in full operation and with labor for practically every man that desired it and at good wages.

*Pig Iron.*—The pig iron trade in 1904 was only fairly satisfactory. Had it not been for the very general improvement which came to the trade in September and which has since resulted in an advance in prices on Bessemer, foundry and forge iron of fully $4 a ton the year would probably have shown a loss to some furnace operators who have to sell their product in the open market. The advance in prices in the last four months of the year pretty well evened up for the low prices ruling in the first eight months of the year, so that the average prices obtained for the entire year will allow a fair margin of profit for the year's operation. The blast furnace operators had the advantage of cheaper ore and coke this year than in 1903, and this lowered the average cost of making iron. On January 1, 1905, there were a total of 43 blast furnaces in the Pittsburgh district, with a weekly capacity of about 100,000 gross tons, or say 5,000,000 tons a year, which is about 30 per cent. of the output of pig iron in the whole country. Of these 43 furnaces no less than 30 are owned by the Carnegie Steel Company, four by the American Steel & Wire Company, one by the Clinton Iron & Steel Company, six by the Jones & Laughlin Steel Company, and two by the National Tube Company. Every blast furnace in the Pittsburgh district was in operation at the close of the year with the exception of No. 1 stack at Neville Island, owned by the American Steel & Wire Company, one Isabella stack of the Carnegie Steel Company and the two Donora furnaces of the same ownership. This is in sharp contrast with the conditions existing on January 1, 1904, when nearly half the stacks in the Pittsburgh district were idle.

*Bessemer Pig.*—The year opened with the pig iron industry at a very low ebb, production having fallen to about 860,000 tons a month, or only about 60 per cent. of the total annual capacity of the country. Prices were low, and Bessemer pig iron was selling at about $13, Valley, or $13.85, Pittsburgh. There was no important change in the market until about February 15, when the trade commenced to improve, and the United States Steel Corporation blew in a number of idle stacks. About March 1 the corporation entered the market and bought 130,000 tons of standard Bessemer iron from the Bessemer Pig Iron Association and W. P. Snyder & Co. at $13, Valley, or $13.85, Pittsburgh. Pig iron production in February showed an increase over January of nearly 300,000 tons. The Steel Corporation held options on two lots of Bessemer iron of 40,000 tons each, and the pig iron market was showing much betterment. About March 15 the corporation bought 49,000 tons of Bessemer iron at $13, Valley furnace, and held an option on 40,000 tons more, good until April 10. Prices of Bessemer iron advanced by April 1 to $13.50 at furnace and the trade was fairly active. At this time the Steel Corporation declined to buy the 40,000 tons of Bessemer iron on which it held an option, and this perceptibly weakened the market. The refusal of the corporation to buy this iron was because it had just completed negotiations for the purchase of the three blast furnaces and open hearth steel plant at Clairton, which gave it about 900 tons of additional iron per day and about 1200 tons of open hearth steel. During the summer months the Bessemer pig iron market continued exceedingly quiet and was without special feature. By July 1 Bessemer pig had declined to $11.50, Valley, and it was claimed that at this price there was no profit to the furnace operator. About August 1 the famous conversion deal was made between the Pittsburgh Steel Company and the Republic Iron & Steel Company, under the terms of which the former bought 110,000 tons of Bessemer pig iron from outside furnaces, for conversion into billets, at $6.25 a ton for the conversion. The purchase of this iron had the effect of bettering the market to a considerable extent, and in July the production crept up to about 13,000,000 tons a year. July and August were very dull months, and also the greater part of September. In the latter part of that month the pig iron market commenced to show improvement, and at a meeting of the Bessemer Pig Iron Association, held in Cleveland on October 8, the price of Bessemer and basic iron was fixed at $12 at furnace for balance of the year. However, this price was not enforced very long, and by November 1 Bessemer iron had reached $13, Valley furnace. At this time the Lackawanna Steel Company entered the market and bought 15,000 tons, and from this time up to the close of the year there was a steady advance in prices of Bessemer and basic iron, the year closing with both grades firm at $16 at furnace. In the first week of December the United States Steel Corporation bought 25,000 tons of Bessemer iron for December shipment at $15.50 at furnace, and the sale of this iron practically cleaned up the available iron of the Valley furnaces. For the first three months of 1905 the furnaces quote $16 to $16.50 for both Bessemer and basic and the outlook is very encouraging.

*Foundry Iron.*—On January 1, 1904, Northern No. 2 foundry iron was held at about $13, Valley, or $13.85, Pittsburgh. By March 1 the price had declined to about $12.40, Valley, while Southern No. 2 was $9.25 to $9.50, Birmingham. The foundry iron market was very dull during the summer months, Northern No. 2 having sold in special cases as low as $12, Valley. In September and October large consumers such as the Westinghouse interests, the Standard Sanitary Mfg. Company and other concerns decided that as Northern No. 2 iron was selling as low as $11.65 to $11.75, Valley, it was a good time to buy, and accordingly they placed contracts for upward of 50,000 tons, which had the immediate effect of stiffening the market. From October 15 prices of No. 2 iron steadily advanced, and at the close of the year $16.50, Valley furnace, was being quoted, with small sales for spot shipment being made at $17, at furnace.

*Forge Iron.*—In January, 1904, Northern forge was held at about $12.75, Pittsburgh, or about $11, at Valley furnace. By March 1 the price had advanced to about $12, at furnace, or $12.85, Pittsburgh. This price was maintained through March and April, but commencing with May and running through the summer months up to October forge iron was quiet in demand and prices were ruling low. In July Northern forge sold at less than $11, Valley furnace, and the market was very dull, continuing so until October, when the demand became heavier and prices steadily advanced until the close of the year, when Northern forge sold at $15 to $15.50, at Valley furnace, some sales for second quarter delivery in 1905 being reported as high at $16. During the latter part of November and in all of December forge iron was very scarce, and consumers had trouble in getting this fast enough to meet their requirements.

*Steel Rails.*—The official price of $28 a ton for standard sections was maintained through all of 1904, and at a meeting of the Rail Association, held in New York, on December 10, this price was reaffirmed for 1905 delivery. The rail production in 1904 was about 2,000,000 gross tons in round figures, but this is expected to be exceeded in 1905, the output for the new year being estimated at 2,500,000 to 2,800,000 tons. The new modern rail mill of the Lackawanna Steel Company, at Buffalo, has been completed, and this company has been given a larger percentage in the pool. The Republic Iron & Steel Company will be a factor in the rail trade before 1905 closes, as its

new mill being built at Youngstown is expected to be ready to roll rails by July next.

*Steel Billets.*—The market on steel billets, sheet and tin bars was held pretty well under control during 1904 by the Billet Association. The year opened with Bessemer and open hearth billets selling at $23, Pittsburgh, an advance of $1 being charged for long sheet or tin bars. The billet trade was very quiet during the first three months of the year, the large consumers being covered by a special contract, and there was more or less cutting in official prices. A meeting of the Billet Association was held in New York early in April and prices were reaffirmed. The steel market continued quiet during May and June, and in the latter month official prices were being shaded as much as $2 a ton. On July 7 a meeting was held in New York, and the official price of $23 for Bessemer and open hearth billets was reaffirmed. Early in August the association was practically disorganized on account of the conversion deal made between the Pittsburgh Steel Company and the Republic Iron & Steel Company. Prices were being very materially shaded, Bessemer and open hearth billets selling as low as $19 a ton, or $4 a ton less than the supposed official price. A committee of steel manufacturers held almost daily sessions, trying to bring the disorganized factions of the association together, and at a meeting held in the Union Club, Pittsburgh, on September 19, the Billet Association was again reorganized, but a reduction of $3.50 a ton was made in Bessemer and open hearth billets and $2 a ton on sheet and tin bars. This made the price of Bessemer and open hearth billets $19.50, long sheet and tin bars $21.50 and cut bars $22, f.o.b. Pittsburgh. The restoration of the Billet Association had the effect of steadying the market, and the above prices continued in force until November 15, when at a meeting held in New York prices on billets, sheet and tin bars were advanced $1.50 a ton, making billets $21, long sheet and tin bars $23 and cut bars $23.50, all f.o.b. Pittsburgh, actual freight to destination being added. In November and December the demand for billets and bars was exceedingly active, and at the close of the year premiums of $1 to $2 a ton were being paid by consumers over official prices.

*Connellsville Coke.*—The coke trade of 1904 was fairly satisfactory, the last three months of the year showing a very heavy demand and a sharp advance in prices of both furnace and foundry. At the opening of the year Connellsville furnace coke was selling as low as $1.40 a ton, though some of the standard brands were held as high as $1.60 a ton. During February and March operators found it almost impossible to get cars, and the situation in this respect was probably worse than at any time in the history of the coke trade. When April came there was a plentiful supply of cars, but the demand for furnace coke was dull at $1.50 to $1.60 a ton at oven. Trade continued quiet through the summer months, but with the improvement that came in the iron trade in October conditions in coke also improved and prices steadily advanced. The starting up of so many blast furnaces in the last three months of the year brought about an enormous demand for coke, and in November and December contracts for strictly Connellsville furnace coke were made as high as $2.15 a ton at oven, while 72-hour foundry was selling at $2.25 to $2.50 a ton at oven. Furnace coke for spot shipment, which was scarce, sold at $2.35 to $2.40 a ton. The coke trade suffered severely in November and December for lack of water, which materially restricted the output.

*Finished Iron and Steel.*—In the first two months and the last three months of 1904 the tonnage of orders in finished iron and steel was fairly satisfactory, but in the intervening months, especially in the period from April to September, the demand was at a low ebb, and there was some shading of official prices in plates, structural steel and steel bars. Had it not been for the price agreements which existed on a number of products it is practically certain there would have been more or less demoralization and very low prices made. These price agreements were severely tested, and, while they were more or less elastic, in the main they had the effect of steadying the market and were beneficial to the whole trade. The year opened with beams, channels and plates selling at 1.60 cents f.o.b. Pittsburgh, and this price remained in force until the first week in September, when both plates and structural steel were reduced $4 a ton, or to the basis of 1.40 cents, Pittsburgh. On plates narrower than 24 inches prices were reduced $6 a ton, or to the basis of 1.30 cents, Pittsburgh. The demand for both plates and structural steel showed great improvement in the last three months of the year, and at a meeting of the Plate and Structural Steel Association, held in New York on December 20, prices were advanced $2 a ton, or to the basis of 1.40 cents, Pittsburgh, for tank plate 6¼ to 14 inches wide, and 1.50 cents for over 14 inches and up to 100 inches in width, while beams and channels up to 15-inch were advanced to 1.50 cents. During the early part of the year reductions were made in prices of sheets, tin plate, iron and steel bars and merchant pipe, to meet existing conditions in these trades, all of which were duly noted in our regular weekly market reports. In the last two months of the year prices on these products were advanced, in some cases several times, owing to the heavy demand and higher prices for raw materials. On October 19 the National Tube Company advanced prices on merchant pipe $2 a ton, and on November 1 another similar advance was made. On November 17 prices of black sheets were advanced $2 a ton, and galvanized $3 a ton, and this was followed on December 22 by another advance of $2 a ton in black sheets. On the latter date the American Sheet & Tin Plate Company advanced prices of tin plate 10 cents a box, or to the basis of $3.50 net, f.o.b. Pittsburgh, for 100-pound cokes. The outlook at the opening of the new year for finished iron and steel is exceptionally bright, and predictions are freely made that the tonnage in 1905 will be very much larger than in the year just closed.

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The latest use of wireless telegraphy is in what is known as the De Forest wireless ship localizer. Its purpose is to advise vessels of their distance from dangerous points, such as rocks or shoals. The ships which are equipped to make use of the signal system will have wireless telegraph plants, which will be in communication with numerous stations along the coast. Part of the same apparatus will be used both in the localizer and in the message telegraphing apparatus. It is proposed to make experimental trials on the great lakes, it being the intention to erect 52 automatic stations at the principal danger points in addition to the 10 stations used for sending and receiving commercial messages. The effect of these automatic stations will reach about six miles, and they will operate continuously upon the approach of storms or fogs. Each will have its own call, consisting, for instance, of three initials, and as soon as these are heard by a listener at the wireless instrument on board a ship he will know he is within six miles of the station whose signal he recognizes. The strength of the signal increases as the vessel draws nearer to the sending station, so that the approximate distance can be easily ascertained. The instrument for determining the direction of the station makes use of a long flat screen instead of the antennæ wires used for ordinary wireless signaling. This is mounted pivotally so that it may be pointed in any direction. By constantly turning the screen while the warning signals are being received the direction will be indicated by an apparatus which works on much the same principle as a mariner's compass.

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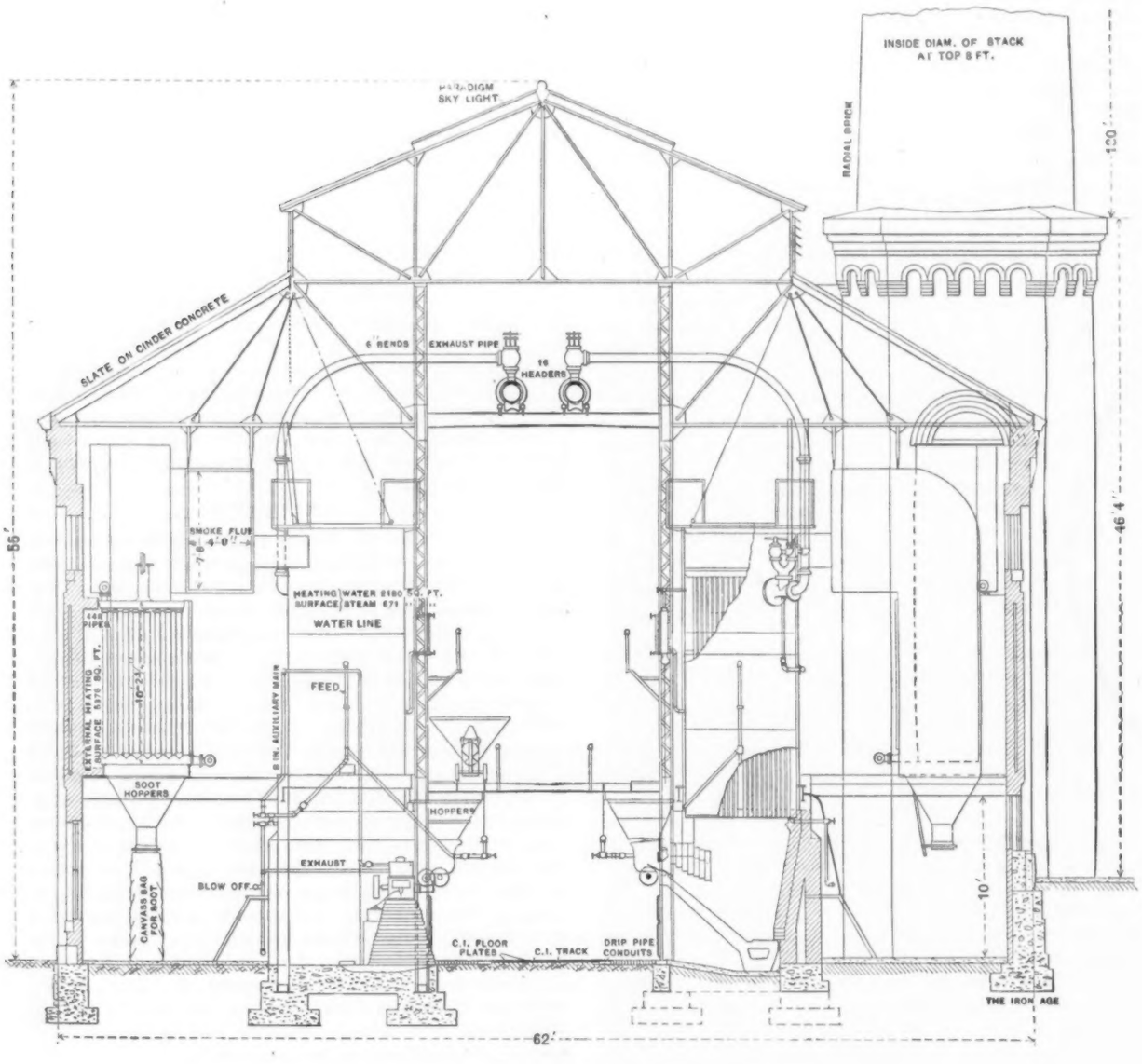
"The Engineers of America" will be the title of a directory of the engineering profession which is now being compiled by E. C. Brown, the editor of the *Progressive Age*, 280 Broadway, New York. The names will be obtained mainly from the membership list of the various engineering societies, and those whose work entitles them to such prominence will be given short biographies. The need of a book of this kind has been long felt, and it is hoped that the editor may have the co-operation of any who are in position to assist him.

## The Atlantic Mills Boiler Plant.

The new boiler plant of the Atlantic Mills, Providence, R. I., has several original and radical features the performance of which is being watched with interest by mechanical engineers and owners of power plants of a similar class. It is believed to be the most compact plant ever erected, having only one tier of boilers. The boilers form the most unique part in the design, and it is to them that the economy of space is largely due. They are of the upright fire tube type, without water legs and with brick fire boxes. An innovation is the use of the McDaniel siphon to assist in the rapid generation of steam from a cold boiler, and many other features of the station are of interest because of their originality. So far the plant has shown a high efficiency, as it has been found that the boilers and economizers will evaporate more than 10 pounds of water per pound of coal.

The power plant beyond the boilers—that is, the steam turbine, electric generator and condenser equipment—was described very fully in a paper presented before the American Society of Mechanical Engineers last month by George I. Rockwood, the engineer who designed the complete plant. An abstract of this paper appeared in the December 8 issue of *The Iron Age* and will be of interest to refer to, as it describes the first plant in which ejector condensers have been used in connection with steam turbines, and the results have been remarkable in many respects. The problem of designing the boiler plant was complicated by the fact that the manufacturing processes in the mills called for the greater part of the steam, the only steam required for power being that supplied to a 400-kw. Westinghouse turbine. The demand for steam from the mills is intermittent. When the mills open in the morning there is a tremendous demand for steam from the dyehouses, which later falls off, but is renewed at intervals throughout the day. Consequently the fires must be maintained in a bright condition even during periods of small demand for steam.

As has been implied, the limited land available was an important consideration. The boiler house is but 62 feet square in its outside dimensions, making the floor space per boiler horse-power 1.28 square feet. This is interesting when compared with the new power station for the New York Rapid Transit Company, where, although the economizers are on an upper deck, the area is 1.52 square feet per boiler horse-power. It must be remembered, moreover, that the Rapid Transit station develops 60,000 horse-power and the Atlantic Mills only 3000.




Vertical Section through the Boiler Plant of the Atlantic Mills, Providence, R. I.

The boiler plant, a cross section of which is shown herewith, contains two facing batteries of six boilers each. Each boiler is 7 feet in diameter and contains 292 tubes, each 2½ inches in diameter and 15 feet long. The boilers are designed for 200 pounds pressure and are rated at 250 boiler horse-power each, making the total 3000. Roney stokers of standard form are used, but the arrangement has the original feature that the stoker receives the coal from a small bunker built directly on top of the stoker hopper, the bunker holding 1 ton. The coal is delivered to the bunkers in tip cars running on tracks at a level just above the bunkers, each car having the same capacity as a bunker—1 ton. Under ordinary conditions 1 ton of coal will run a boiler four or five

hours, so that a bunker need be replenished only a little more frequently than twice a day. It was originally intended to load the cars by gravity from outside coal pockets on a higher level, but this plan has not yet been carried out. At present the loaded car is raised on a hydraulic elevator from coal pockets outside the building to its track level in the station after being loaded by hand at the pockets. The car tracks pass over scales, so that the weight of coal used may be easily kept.

The boilers are covered with magnesia covering 2 inches thick, and an air tight joint between the steel boiler and the furnace is made by flaring the covering out over the brick work. The two economizers are mounted upon steel I-beams, without special brick work, being inclosed on one side by the wall of the building and on the other side by steel plates lined with magnesia. The outside course of brick of the wall is set off 2 inches from the two inside courses at points opposite the economizer to form an air space, and gives an attractive architectural effect to the exterior of the building. The economizers are inclosed underneath with steel soot hoppers, having bottom gates so that after cleaning the soot may be drawn off into sacks and removed. This hopper arrangement is a novelty in economizer practice and is said to be very satisfactory in its practical operation.

The smoke flue is of steel, 4 x 7½ feet, and is connected by short uptakes, 21 inches by 5 feet, to the smoke bonnets on top of the boilers, the bonnets being of ⅜-inch steel. Several claims of advantage are made for the fire brick furnace and the absence of the water leg. The furnace is economical owing to its unusual hight, over 7½ feet from the dumping grate to the crown sheet, which gives a very large combustion chamber. The boiler may be forced excessively, because of its excellent circulation. It is contended that the presence of a water leg tends to interrupt free circulation by its cross currents meeting down currents. The limit to the strength of the Rockwood design of a vertical boiler is set by the strength of the boiler shell itself, which may be made as heavy as desired, there being no mechanical limitation as in horizontal boilers, where the shell is exposed to the fire. Where the upright boiler is of large diameter the value of a water leg as a mud drum is of small consequence, it is claimed, because with or without it such dirt as the water may contain will invariably be deposited on the crown sheet around the tubing, owing to the natural direction of the circulation currents. Another objection to the water leg is that it increases the space occupied. It is also easier to remove deposits from the crown sheets of upright boilers devoid of water legs, as they are more accessible. The upright boiler under any normal conditions of steam pressure is safe even with an excessive amount of scale and grease on the crown sheet, as the tubes will carry away the heat. In this particular upright fire tube boiler excessive heating of the crown sheet acts very much as it does in an automobile boiler; in fact, the Atlantic Mills battery is very similar to a battery of automobile boilers on a large scale. When excessive heat is applied to the crown sheet the fire tubes, failing to expand sufficiently, will be caused to leak freely, and the escaping steam, displacing the air in the fire box, will extinguish the fire.

This type of boiler has a special advantage when intended for supplying steam turbines, as a large proportion of tube surface is in the steam space, where it acts as a superheater. The temperature of the steam is raised about 42 degrees above the point of saturation, which is sufficient superheat for the satisfactory operation of steam turbines.

The McDaniel siphon as a means of getting up steam quickly is peculiarly desirable in this plant, as an attempt to force the fire under a cold boiler develops great strains. The piping is so arranged that the steam from any one boiler may be introduced into any other. Steam is admitted to the siphon from a 3-inch auxiliary steam main. The steam when admitted to the boiler draws the water from the bottom through the blow off and injects it into the feed pipe. It will be appreciated that this accelerates the circulation of water in the boiler. The siphon is useful in the night in getting rid of superfluous steam by blowing it into cold water in other boilers instead of wasting it through the safety valves.

The structual steel work of the boiler house was designed with reference to the convenient mounting of the boilers. The pitch roof with a monitor made it possible to secure necessary space without carrying the brick side walls up to a great hight. The walls are only 33 feet high, while the distance from the floor to the apex of the monitor is 55 feet. This gives the necessary vertical space for handling tube cleaners. As will be noticed, the roof is of stiff design, the upright posts adding much to the support of the roof trusses, although they also rest upon the walls. This design was chosen rather than a truss strong enough to be self supporting on the walls because the posts were necessary to support the boilers up to the economizer floor level. The posts also support the galleries in front of the water columns, whereas usually the galleries are attached to the boilers. This type of construction also afforded convenient means of supporting the smoke flue, steam main and pipe gallery.

Ventilation and light are provided, the latter through a Paradigm skylight 16 feet wide running the length of the boiler house. As the steam main is supported in what is naturally the hottest part of the building, it is found that snow does not accumulate on the skylight and keep out light. The roof is of slate, over expanded metal and cinder concrete. The foundations of the side walls and chimney are of Portland cement concrete. The base of the chimney is of common brick to the hight of 46 feet, and for the 130 feet above is of Custodis radial brick. The gases are delivered into the chimney at a temperature of 280 degrees when the boilers are developing 2500 horse-power.

As the cost of a power house building is directly proportional to the square feet of floor space required, reducing the space between the boilers reduces the cost of the building. In the Atlantic Mills boiler house the space between the boilers is 6 or 7 feet less than is possible in a plant of horizontal boilers, where space must be provided for taking out or cleaning tubes. Radiated heat also effects the space required, and as the furnace front, with the Roney stoker, is quite cool, its use in combination with the fire tube type of vertical boiler makes the narrower space possible.

The matter of cost is an interesting one. These boilers, built by the Stewart Boiler Works, Worcester, Mass., cost $1650 each erected upon the steel foundations with smoke bonnet and mountings ready to be piped, which is $7.33 per horse-power, or 77 cents per square foot of water heating surface. The Green economizers cost $10,294 erected, or 96 cents per square foot of water heating surface. The heating surface of each boiler is 10 square feet per horse-power, while that of the economizer is 4 square feet per horse-power. In view of the common doubt as to the wisdom of putting in economizers because of the increase in size of the boiler house which their use is supposed to entail, it is of interest to note that in the Atlantic Mills boiler house the economizers perform more than the equivalent of the work of two boilers; that is to say, if economizers had not been used there would have been at least two more boilers needed. Such an addition would cost, for added length of building, boilers, furnaces, smoke flue, stokers, iron work, &c., about $16,000, most of which it saved by substituting economizers for these boilers. It is found that the economizers save about $5000 worth of coal per annum. The cost of the plant complete was $106,025.36, or $35.34 per boiler horse-power.

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British coal production during the last decade has shown a steady growth, but the prices, though increasing considerably, have not been steady. The production in 1894 was 188,300,000 tons, valued at $1.62 per ton. For the next four years the production advanced gradually, reaching 202,000,000 tons during 1897 and 1898, while the price was only $1.42 to $1.54 per ton. From this point on the price has been continuously higher, reaching a maximum of $2.63 per ton, with a production of 225,200,000 tons, in 1900. In 1903 the production was 230,300,000 tons, and the average value $1.87 per ton. The first five years of the decade showed an average value of $1.50 per ton, while the last five gave $2.12 as the average.

## The New Sturtevant Generating Set.

A generating set, consisting of a horizontal high speed center crank automatic engine and an eight-pole generator, which embraces several new features, has recently been designed by the B. F. Sturtevant Company, Boston, Mass. This company has been engaged in the manufacture of engines and generators for several years, and has perfected this new set to sell at a moderate price.

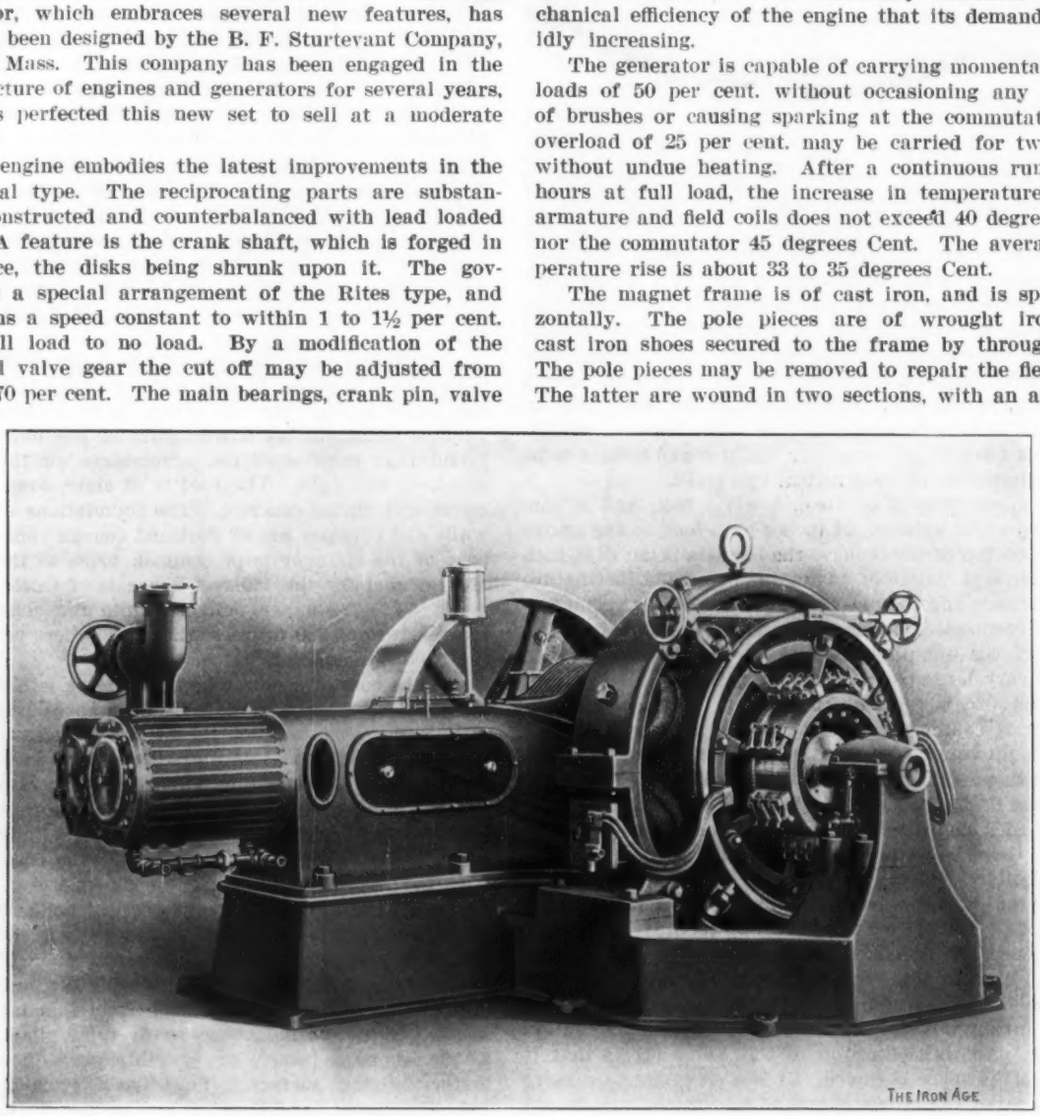
The engine embodies the latest improvements in the horizontal type. The reciprocating parts are substantially constructed and counterbalanced with lead loaded disks. A feature is the crank shaft, which is forged in one piece, the disks being shrunk upon it. The governor is a special arrangement of the Rites type, and maintains a speed constant to within 1 to 1½ per cent. from full load to no load. By a modification of the Marshall valve gear the cut off may be adjusted from zero to 70 per cent. The main bearings, crank pin, valve stem and slides are well babbitted with Sturtevant white metal. A recent and important improvement is the watershed partition, which prevents water from the piston rod stuffing box reaching the interior of the engine frame, and oil on the reciprocating parts from being thrown out into the engine room. The main body of the engine is inclosed on both sides by removable plates, as may be seen from the illustration, and the crank webs are inclosed by a cast iron hood having two holes with removable covers, one for the purpose of cleaning the crank pin box while it is in motion, and the other for removing the box without taking off the large hood. Between the watershed partition and the front end of the cylinder is a hand hole, for reaching the stuffing box bolts, which has no communication with the oil spaces.

The oiling is effected either by a gravity or tank system or by force pump lubrication. With the gravity system, shown in the illustration, an oil tank supplies the pipes leading to the parts to be oiled. At each point where the oil is delivered there is a small gauge glass and a valve for regulating the flow. A valve just below the tank regulates the entire supply. With the forced lubrication system, a pump is located in the base of the engine and operated by the crank shaft. Oil is delivered from this pump to the main bearings, and from the main bearings through holes in the crank shaft and web to the crank pin. From this point the oil is conducted up through a hole in the connecting rod to the cross head pin. A separate set of pipes conveys the oil from the cross head guides to the valve stem guides. The pressure of oil in the bearings under this system will vary from 12 to 18 pounds per square inch. This system of lubrication so materially increases the mechanical efficiency of the engine that its demand is rapidly increasing.

The generator is capable of carrying momentary overloads of 50 per cent. without occasioning any shifting of brushes or causing sparking at the commutator. An overload of 25 per cent. may be carried for two hours without undue heating. After a continuous run of ten hours at full load, the increase in temperature of the armature and field coils does not exceed 40 degrees Cent. nor the commutator 45 degrees Cent. The average temperature rise is about 33 to 35 degrees Cent.

The magnet frame is of cast iron, and is split horizontally. The pole pieces are of wrought iron with cast iron shoes secured to the frame by through bolts. The pole pieces may be removed to repair the field coils. The latter are wound in two sections, with an air space between the shunt and series coil. The shunt winding is of wire so treated as to be practically waterproof, and the series winding is of solid copper bars. The armature is of the ironclad, form wound, ventilated drum type, having a laminated core mounted upon a cast iron spider. No bolts pass through the armature laminations. The armature spider has an extension upon which the commutator is mounted. The armature conductors are copper bars without joints, except at the commutator end. When these bars are formed they are insulated by material not perceptibly affected by heat or ordinary atmospheric moisture.

The commutator is constructed of drop forged or drawn segments secured in cast iron shells of spider construction and clamped in place with a steel ring. The segments are insulated with carefully selected mica of a degree of hardness to allow the mica and segment to wear uniformly, obviating trouble from hard mica. The end insulation consists of micanite rings, and the whole commutator is assembled while hot, under great pressure. Carbon brushes are used with an area of contact of at least one square inch for every 30 amperes of current. These brushes are carried in holders, mounted upon a self contained brush rigging so arranged that the entire set of brushes may be rotated completely around the commutator. Hand wheels are furnished for adjusting the brushes in position, these hand wheels being so located that the brushes may be adjusted from either side of the generator.




New High Speed Engine Generator Set, Built by the B. F. Sturtevant Company.

# The Southern Iron Market in 1904.

BY JAMES A. GREEN, CINCINNATI.

Shakespeare's happy title "All's Well That Ends Well" may appropriately be applied to the year 1904 in the pig iron business. The year is winding up so splendidly and with such enthusiasm and such an optimistic feeling as regards the future in all branches of the trade that its gloomy beginning may be almost forgotten. To tell the plain truth, the year has been like one of those gloomy, uncertain days which drag along slowly with more or less uncertainty as to what disagreeable turn the weather may take, until late in the afternoon the clouds roll away and the sun shines out gloriously with a "red at night." So that now, instead of the sailors' delight, all those concerned in the making and handling of pig iron are looking forward to a fair and fortunate new year. Trade seems to be hoodooed in years of Presidential elections. It is useless to speculate on the reasons for this, for the fact remains, and facts are very vital and concrete things.

The South has had a great deal more than its share of trouble this year, for on July 1 in the Birmingham district the coal miners struck, and this strike is still in progress. The fight on the part of the operators was for the open shop principle. The Tennessee Coal, Iron & Railroad Company has borne the brunt of the conflict, D. H. Bacon, chairman of the company, taking a manly and vigorous stand for the right of independent existence and for the right of managing the company's affairs in a businesslike manner, without dictation and without interference on the part of outsiders. This strike has lasted for six months, although at the present time the situation is beginning to very decidedly improve, and the outlook for a complete resumption of work at all the mines is good.

In 1904 was shown in a very convincing fashion the increasing financial strength of the South. With the exception of the last quarter of the year business has been extremely depressed and prices have been anything but remunerative. Five years ago such a season would have practically exhausted the financial resources of many of the Southern iron companies. This year they have not been seriously inconvenienced, but have been able to hold iron for a better market, and generally have managed their affairs in a very different fashion than was necessary in the old days when the wolf was so constantly at the door. There have been some very notable exhibitions in the South of wise financial management, of sagacious husbandry of resources and of conservative management that will appeal strongly to all business men who appreciate such measures of far sighted and proper policy. Ten and fifteen years ago a great deal was said about the "cheap labor" of the South. Cheap labor of the South was a delusion and a snare. It never really was cheap. What was needed was not cheap labor, but efficient labor, and there has been tremendous progress along this line. To-day there is not in the South the distinctive cheap labor that there used to be, but a dollar expended in labor is beginning to produce a dollar in results, just as it does in more northern districts. Of course, changes like this do not came rapidly, but are necessarily matters of development and evolution. Yet, steadily, year by year, substantial progress along all modern industrial methods is being made in the iron producing districts of the South, and these districts will begin the year 1905 distinctly in advance of where they were two or three years ago.

Probably the best way to give a graphic idea of the events of the year would be to describe the situation month by month, so that the story may be followed contemporaneously, as it were.

*January.*—The month opened stupidly, with a flat and unsettled market. Consumers generally throughout the North were apprehensive and they were all paying labor the highest wages known for years as the result of the boom of 1902, and their prices on their own products had so fallen, or demand was so slack, that they saw very little prospects ahead. The January market opened with No. 2 foundry held in Birmingham at $9.50, but the leading companies had sold so largely in November and December at $9 up to $9.50 that they were under no immediate pressure to sell. They had accordingly, by mutual agreement, practically withdrawn from the market by putting the price to $10. The heavy buying during the closing months of 1903 at $9 apparently came not so much from actual needs, but because of a widespread conviction that iron was cheap and it was wise to buy at the bottom. Accordingly very little $10 iron was sold. A few carloads were bought to complete mixtures, but the whole situation was unsettled and full of doubt. Northern iron in December had been held at $13, f.o.b. Ohio furnace, and about the beginning of the month the price of $12.50 was made, and it was very evident that the Northern furnaces were in distress. In spite of the understanding that Southern iron should be held at $10, before the month was over there were sales at $9.75, and in a number of instances No. 2 Northern was sold at $12. The Northern furnaces during the closing months of the previous year had sold no iron of any consequence, as the market entirely belonged to the South. Accordingly they went into 1904 with bare order books and were in urgent need of business. They accordingly started on a vigorous campaign to get all the tonnage possible, and as the Southern furnaces were holding at $10 and $9.75 they had very fair opportunity, and the Northern tonnage of foundry iron in the Middle West considerably exceeded the tonnage of new business placed for Southern iron.

*February.*—February began in a more dull and lifeless fashion than even the preceding month. Owners of furnaces were much discouraged and a good many forced sales were made at prices that necessarily meant heavy loss. In the face of Northern competition Southern prices began to sag and by the middle of the month No. 2 was down to $9.50 at Birmingham, while there were sales of gray forge at $8 and $8.25. Even at these prices but little business was done. There seemed to be an utter absence of confidence. In the light of later developments it seemed astonishing that these prices could actually have been in effect for more than a few days. If buyers had really been wide awake and alive to the situation they should have taken up all such low priced lots of iron so quickly as to put the low price sellers out of business inside of a week. The buyers were not even satisfied with the prices which were being made. They had fixed their ideas of No. 2 at $9, and mill men were talking of gray forge at even less than $8. Consumers stayed out of the market, as though they had entered into a general conspiracy to overpower the situation. By the end of the month several of the Southern furnaces were freely offering gray forge at $8 and No. 2 at $9. Yet at these prices there was no enthusiasm to buy and there was no rush to cover requirements. Consumers stated that they were expecting still lower prices, but all at once, just as the month was ending, like a bolt from a clear sky came the reported purchase of more than 200,000 tons of Bessemer by the Steel Corporation. This started a demand for Southern gray forge. Sales began at $7.75 and $8 and the amount taken was so large that within a few days the South was practically swept clean of mill metal. It was surprising to see the whole situation change practically in 24 hours. Consumers who had one day predicted that within a month prices would be $1 per ton lower were clamoring for pig iron and were willing to pay the full asking prices, which, Heaven knows, were low enough.

*March.*—The month began with the liveliest kind of a buying movement. It was like the good old days of 1902. It found the consumers actually with some backbone in their bodies and some hope in their minds. No. 2 foundry sold freely at $9; in fact, it sold so freely that the sellers who were making that price were bought out of the market in less than a week. The price jumped to $9.25, and sales at that figure were larger than at $9. However, several of the largest of the Southern producers had refused to sell at the very low quotation that had been ruling, and when forge reached $8.25 and No. 2 $9.50 they came into the market and in less than a week they had not only sold all the available stock on hand, but most of their prospective make for the second quarter of the year. By the 15th of March the entire Southern

situation had changed from one of gloomy apprehension and despondency to one of cheer, hope and encouragement. Iron became scarce. Prices went to $9 for forge and $10 for No. 2. These advanced prices came suddenly and they immediately checked the trade. But so much iron had been sold that it was now a matter of complete indifference to producers whether the market did or did not respond to the advance. After the advance there was a period of a week or so when very little was doing. Before the month ended a very fair business had been done at the new prices. Some consumers came into the market for deliveries throughout the entire year and willingly paid the top asking prices. It became evident that most of the Southern iron had been sold for April, May and June that could be made, and statistically the situation was stronger than it had been at any time since January and February of 1903. The news was made public that one of the large Southern companies had sold during the month about 100,000 tons and that another had sold over 75,000 tons. This tremendous new tonnage on the order books made the furnaces exceedingly independent, for there was not one of them that now was hungry for business. All of them were in excellent shape to wait for natural developments in the market. There were many predictions that the tide had turned for good and the trade during the balance of the year would be active and at remunerative prices. However, there was always a shadow falling athwart the present sunshine in the market—the constant fear in 1904 because it was the Presidential election year. The Presidential elections and good times in the iron trade notoriously do not travel in the same boat.

*April.*—The month opened with a more optimistic feeling than had been in the market for a long time. It really seemed as if the tide had turned. Prices were very firm, and while there was no large buying, yet there was a steady run of scattering orders at these prices, f.o.b. Birmingham: No. 1 foundry, $10.75; No. 2 foundry, $10; No. 3, $9.50; forge, $9. The tonnage sold commenced to assume very decent proportions, particularly on iron bought for delivery over the last half of the year. Just about the middle of the month, however, the situation changed very suddenly owing to the rumor that the United States Steel Corporation had not bought all the iron that it was claimed had been purchased, but that it had taken options and that these options had been canceled. This was taken as a sign that something was wrong. The flowery announcements of a growing and better trade in the steel end of the business did not harmonize with this unexpected cancellation of pig iron tonnage, and once more the old feeling of doubt and uncertainty began to prevail. From hope and optimism the situation became pessimistic. The fair prospects with which the month began were blighted, and as a whole April business was exceedingly disappointing. The rally had been nipped in the bud, so to speak.

*May.*—In spite of the changed feeling in the market there was no alteration in the nominal prices. No. 2 continued to be quoted at $10, Birmingham, but presently some makers offered to sell at $9.75 and even $9.50. It seemed ridiculous that with the lower grades so scarce in spite of relative values gray forge should have gone at $9, yet it seemed impossible to get more than this price, notwithstanding the fact that there was a ready market for mill metal. Very fortunately for the general situation the cast water pipe business was exceedingly good. Other branches of foundry trade were dull and heavy. But the pipe works were all full of work; in fact, it was the activity of the pipe works that very largely caused the excellent demand for the lower grades of pig iron. The pipe men took the overwhelming bulk of all the Southern iron that was sold in May. Early in the month the Ohio iron masters had a series of meetings. They did not form a combination nor did they attempt to form a combination. Yet there was some sort of tacit understanding that Ohio iron was not to be offered at less than the following prices: No. 1 foundry, $13; No. 2 foundry, $12.50; No. 3 foundry, $12. However, in spite of agreements or tacit understandings these prices did not remain in force long. There was not enough trade to go around, and prices dropped to a basis of $12 for No. 2, and on an attractive trade even this quotation was occasionally shaded. As for Southern iron, the demand kept falling off and falling off and prices grew weaker and weaker; as one prominent iron master expressed it, "We were in the doldrums or else in the Saragossa, that region of deadly dullness where ships drift around and around aimlessly, never going anywhere nor doing anything."

*June.*—However, disappointing as May had been June saw one of the most stupid and uninteresting markets ever known. There was no inquiry at all. Everything was as quiet as the grave. It was easy to buy iron at the following prices, f.o.b. Birmingham: No. 1 foundry, $9.50; No. 2 foundry, $9; No. 3 foundry, $8.50; forge, $8.25. These prices are usually exceedingly attractive. It does not take a philosopher to figure out that at the present cost of making iron these prices leave no profit whatever to the producer, if, on the contrary, they do not mean a heavy loss. It would have seemed that had there been any elasticity in the situation at all the strong concerns would have loaded up with iron and piled it in their yards. They should have been serenely confident that every ton of iron laid away in this manner would before a great time be worth considerably more money than it had cost. However, this did not prove to be the case. Scarcely any one bought iron to pile it up for future use. The pipe shops, as in previous months, used a good deal of iron, and they saved the situation. As for the general foundry trade, it was apathetic. No one had the least confidence in the situation. The whole market apparently was pervaded with a hoodooism of the Presidential election year. Men who were trying to sell pig iron found that the trade everywhere felt that prices were bound to go lower. Possibly consumers were not to be blamed so much for this mental attitude, for their business was at its lowest ebb. They had but little trade in hand, and the future outlook was not promising, and it seemed no time to take chances. So they only bought little lots now and then when it was a matter of absolute necessity. Toward the end of the month there was considerable inquiry from heavy consumers for large lots. Among others the largest of the agricultural implement consolidations asked for a price on 40,000 tons. These consumers, as it turned out, felt that they might tempt sellers to reduce the already low prices provided a large enough tonnage was offered. Practically none of these inquiries materialized into actual business. The market was weak enough, but there is a point beyond which suffering humanity, so to speak, cannot go, and the large users rather overdid the thing. At all events, their offers to buy round lots from 50 cents to $1 below the market met with no takers. It is highly probable that a good many of these large users have been regretting recently that they did not accept the prices that were made them instead of trying what proved to be the hopeless task of still lowering them.

*July.*—All things considered, July was a very good month in the way of tonnage. Early in the month the Alabama coal miners went out on a strike and more than half of the furnaces in the Birmingham district were forced to suspend operations. The strike was not altogether unwelcome, because it decidedly improved the situation. There were very fair stocks in furnace yards, so that the hand to mouth buying that characterized the month was not interrupted by a lack of iron. Of course, in view of the shutting down of the furnaces and the uncertainty of their resumption Southern ironmasters who had been selling No. 2 foundry at $9 put their price up to $9.50. When the month closed there had been a very decided reduction in the available stocks of good foundry iron. Northern iron this month was in very fair demand, and there was some little buying of basic iron.

*August.*—The Birmingham strike continued to grow worse and worse, and a decidedly bitter feeling developed between the miners and operators. About half of the furnaces were kept running by using convict labor, by importing miners from the outside and by bringing in coke from the Virginia and the Kentucky districts, which were not affected by the strike. The price of $9.50 was rigidly adhered to. This price made Northern iron cheap-

er than Southern iron in the greater part of the Middle West, and in consequence the Northern furnaces took most of what little business there was going. Two large consumers bought heavily, but as a whole the month was a disappointment and its tonnage was not nearly as large as that of July.

*September.*—The market was still in the doldrums, still drifting around in the Saragossa Sea of general apathy. In spite of the continuance of the strike and the obvious fact that more iron was being used and needed than was made in the South, prices began gradually growing weaker, so these quotations were quite freely quoted: No. 1 foundry, $9.75; No. 2 foundry, $9.25; No. 3 foundry, $8.75; forge, $8.25. There was no change at all in the strike situation. The union authorities in Birmingham, instead of giving money relief to the strikers, served relief rations of meat and meal. At the $9.25 price for No. 2 some little business was done. The furnaces, however, would only sell at this price for prompt shipment. Some consumers commenced to have some kind of a dim appreciation apparently of what might happen and tried to buy iron for long future delivery at $9.25, but they found this impossible. Northern iron continued to look up as far as increased sales were concerned, but the price of No. 2 foundry had dropped to $11.50, f.o.b. furnace. All of the Northern furnaces sold quite heavily at this bottom figure. Toward the close of the month $9.25, Birmingham, for No. 2 foundry iron disappeared and the price of $9.50 was established.

*October.*—October was a regular surprise party in the market. There were all the possible logical reasons why what actually did occur should have occurred, but the thing came so suddenly that even the best posted sellers and buyers apparently were equally surprised. The best way of explaining exactly what happened is to give a comparison of prices on the first and last days of the month, as follows, f.o.b. Burmingham:

| | First of month. | Last of month. |
|---|---|---|
| No. 1 Foundry | $10.00 | $12.75 |
| No. 2 Foundry | 9.50 | 12.00 |
| No. 3 Foundry | 9.00 | 11.50 |
| Forge | 8.50 | 11.00 |

As for Ohio iron, there was a similar startling jump, as can be seen from the following comparative table of prices:

| | First of month. | Last of month. |
|---|---|---|
| No. 1 Foundry | $12.00 | $14.00 |
| No. 2 Foundry | 11.50 | 13.50 |
| No. 3 Foundry | 11.00 | 13.00 |

There certainly never was any more radical or wonderful change in the market. The thing began without any doubt whatever in the Birmingham district. One or two large consumers tried to buy round lots of iron, and discovered to their amazement that the iron was not to be had. Just about this time there was a decided demand for Southern basic, which had been quoted at about $9.50, or the price of No. 2 foundry. Some little basic was sold at $9.50, and some was sold at $10. There came then a larger demand for shipment over the first quarter of next year than the furnaces cared to supply, and the quotation of $12 was made. This price was accepted. Almost over night No. 2 foundry Southern iron had gone up to $12, and all other grades in proportion, and there was an active demand, a most startling contrast to the quiet of the preceding period. It began to be evident, too, that there was no danger of any change in the politics of the Administration; that the present Administration was to be continued in power was taken as a settled matter, and this had, of course, a wonderful influence in determining the market. Statistically the position of the market in the meantime was steadily improving in that the visible and available supply of metal for the market had been greatly reduced. The Southern furnaces had really sold not much iron at the low prices during the preceding 60 days, but this month they sold at the full top of the market a very large and exceedingly satisfactory tonnage. The Northern furnaces did not advance their prices as quickly as the Southern furnaces. Their market went up more gradually. In consequence they sold even more iron in proportion than was sold by the furnaces south of the Ohio River. The fact of the matter was that consumers had been running along with practically no stocks on hand. They had been afraid of the market, as every time there had been an advance previously in the year prices had promptly receded after a little activity. These periods of activity received various names, as "broncho booms," "false booms," and the like. But consumption had been gradually increasing. The increase was almost imperceptible, yet it was normal and healthy. The business world had been convalescing after the excesses, so to speak, of 1902. In 1903 there had been trouble everywhere, and the early months of 1904 had shown no improvement, but from the middle of the summer on things had grown better. The Wall Street market for stocks showed the better feeling long before it was actually reflected in real trade. Wall Street by a kind of intuitive instinct realized that a change was at hand, and stocks jumped, just as this month pig iron prices jumped, only in Wall Street the advance was distributed over a long period of time, whereas in pig iron the jump was sudden. In this process of business betterment not only had consumers been content to run along from hand to mouth, but they had gradually taken up most of the salable furnace iron, so that when the great demand came the furnaces were not able to supply all that was wanted. The old laws of supply and demand worked out their inevitable result, as is very evident from a mere glance at the table of prices above.

*November.*—It is well to explain the happenings in the market this month by another table of prices:

| | First of month. | Last of month. |
|---|---|---|
| Southern iron | $12.00 | $13.50 |
| No. 2 Northern iron | 13.00 | 15.50 |

It would seem that Northern iron had a greater advance than Southern iron. All along during the year Northern iron had been at an advantage at practically all points in the North over Southern iron. The freight rate from Birmingham to Cincinnati, for instance, is $2.75, and from Ohio furnaces $1.15. Further away from the Ohio River the freight rate from the South is considerably higher. As a rule the freight rates from Northern furnaces are lower. Northern iron, being thus cheaper to the consumer, had a very ready sale, but even with this handicap Southern iron was sold in large blocks, not only to Southern consumers, who necessarily had to depend upon it, but to the Northern consumers as well. The Presidential election demonstrated the fact that there would be no change in the national Administration, and demonstrated it in the most overwhelming fashion, so that expectations of October in this regard were more than realized. All during the month the strength in the market was fully demonstrated. There was constant buying. Day by day consumers came into the market to cover their wants for the first quarter of the year and beyond. There had been in the South some considerable accumulations of iron which had not been on the market, as producers, having faith in the market, refused to sell at the lower prices during the months of the summer and fall. These accumulations had been referred to frequently as a bear argument, but such was the demand that this month these accumulations disappeared. They were not all shipped out, of course, but the iron was practically sold, so that the menace they might have been to the market was removed. Some faint hearted critics of the situation saw a great danger in these furnace stocks, but, as the event proved, they were entirely mistaken. These faint hearted critics were also full of the idea that the betterment in the market was due to a scare and there was no corresponding demand for finished materials. They argued that raw materials, such as pig iron and coke, necessarily later on would have a very severe slump. It is too early, of course, to say much in regard to this criticism, or possibly it would be better to say this view of the situation. It will take some months to adequately determine how right or how wrong this view of the matter may be. It would seem, however, that this line of reasoning lacked the very necessary element of fact, for by the testimony of a very large majority of consumers the trade in finished lines is very de-

cidedly improved, and the outlook, not only for the immediate, but for the distant future, is exceedingly good. The years 1903 and 1904 pretty well cleaned up the accumulations of all lines of finished material. There is no denying the fact that in 1903 everything was very much overdone. Production along all lines was so large that it took the country about 18 months to digest and absorb the surplus. The Northern furnaces in October had a phenomenal run of business, and the Southern furnaces had all the orders that they wished to take, and as a matter of fact in November there was not a furnace company North or South that did not have the opportunity of taking on a great deal more tonnage than really was booked, as a great deal of iron for forward shipment was rejected. Toward the end of November there began to be again a serious complaint on the part of consumers of the inability to get shipments fast enough. There was a demand for quick shipments that was not being supplied. There were also many requests to have iron bought for later delivery shipped earlier, which is universally regarded as about as good a sign as there can well be.

*December.*—At the present writing the month has not been finished and it is impossible to give the complete record of it. If anything could have given the pig iron market a bad jolt two disastrous slumps in Wall Street would have done it. But such is the intrinsic strength of the iron situation that in spite of Wall Street panics business has gone on uninterruptedly at the very top of the market. Southern foundry has sold at $14 and Ohio No. 2 foundry has sold at $16. The demand has not let up, but has been, if anything, rather more insistent than previously. There is no question at all that during the coming winter consumers are going to have difficulty in getting pig iron and coke that is needed. Furnace companies are already in some parts of the country in distress because of short fuel supplies. Many consumers of pig iron have been already—although thus far the winter has not been characterized by any extreme weather—distressed because of slow and inadequate shipments. When the revival in business first started the bulk of iron was sold for the balance of the year and the first quarter of 1905. Later on there came a heavy demand for shipments over the second quarter of the year. As a rule, today inquiries are for shipments before the end of June, yet at the same time there is a noticeable demand for shipments extending over the third and fourth quarters of 1905.

The Boston Elevated Railway Company operates 435 miles of track by means of power obtained from eight stations, ranging in capacity from 600 kw. to 14,000 kw., the largest single unit being of 2700 kw. Splendid results from an economy standpoint have been obtained at each of the five modern plants, with capacities and costs of generation as follows:

| Station. | Kilowatts. | Cent per kilowatt hour. |
|---|---|---|
| Dorchester | 2,000 | 0.7 |
| Harvard | 3,600 | 0.7 |
| Charlestown | 4,300 | 0.755 |
| Lincoln | 8,100 | 0.725 |
| Central | 14,000 | 0.76 |

These figures cover everything except fixed charges. The average cost of coal during the period in question was $3.60 per long ton.

The cost of the United States naval establishment, according to figures published by *Engineering*, increased from $3,500,000 in 1800 to $4,400,000 in 1820, $6,100,000 in 1840, $11,600,000 in 1860, $21,800,000 in 1870, $22,000,000 in 1890, $56,000,000 in 1900 and $82,600,000 in 1903. During the period covered the fluctuations were wide, the total having fallen to $1,650,000 in 1810; in 1880 it was only $13,500,000. During the Civil War it increased from $12,400,000 in 1861 to $42,600,000 in 1862, $63,300,000 in 1863, $85,700,000 in 1864 and $122,600,000 in 1865, which is by far the highest figure ever reached. The Spanish War raised it to above $55,000,000, which increase appears to have been permanent. The present cost is just above $1 per year per head of the population.

# The New Newark Bay Bridge.

## A Tandem Scherzer Rolling Lift Bridge.

BY S. D. V. BURR.

The Central Railroad of New Jersey crosses Newark Bay on a wooden trestle 1⅞ miles long. The channel is about 2000 feet from the eastern shore, and at this point was located the double track swing bridge, which is now being replaced by two rolling lift bridges placed end to end. When it became necessary to provide a new bridge in order to accommodate the increased and heavier traffic, two considerations were of paramount importance. The first was that provision should be made for increasing the capacity of the draw from two to four tracks whenever the service should demand it. At present the approaches to both ends of the trestle comprise four tracks, and at the regular rate of growth of the system it will not be long before the bay will have to be crossed by four lines of tracks so as to prevent congestion. The second consideration was convenience of erection without interfering with travel during erection. When the present draw

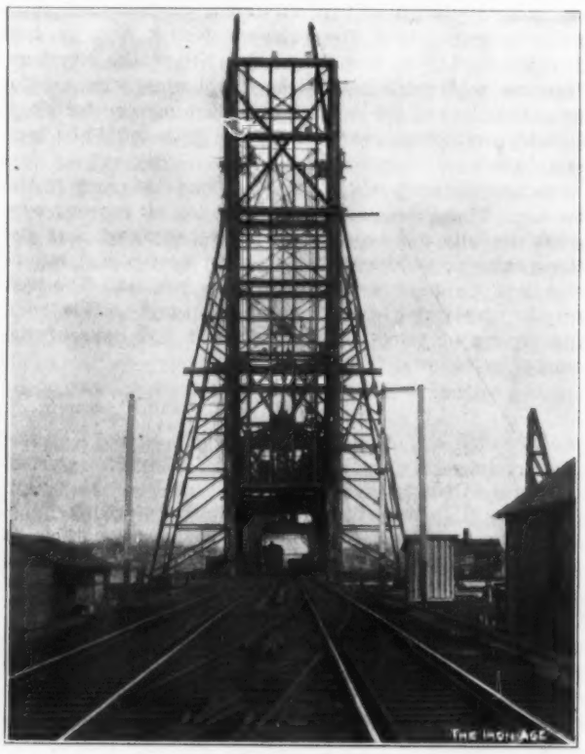



Fig. 1.—View of the Bridge During Erection, Showing a Train Passing Through.

was put in place a single track temporary trestle, provided with a draw, was built around the site and used during construction. This method hampered the handling of traffic in a great degree and compelled the frequent use of the company's Newark branch to pass the obstruction. After carefully weighing all the considerations the engineers decided that a rolling lift bridge would meet the requirements most satisfactorily.

Water transportation at present using Newark Bay is composed largely of tows and boats having a low superstructure. To permit the passage of this craft a swing bridge must be opened to its full extent each time, while a lift bridge need be raised only high enough to clear the topmost part of the vessel. Speed of operation was also much in favor of the lift type. The charter of the railroad requires the maintenance of two waterway passages through the trestle, so that either a draw or a double lift bridge was necessary. For this reason the two lift bridges are placed end to end, tandem fashion, with the operating machinery between.

### Design of the Bridge.

The entire bridge measures, center to center of end piers, 395 feet, and is 29 feet wide center to center of trusses. The clear span of each lift is 110 feet. The bridge is carried by seven piers supported upon piles

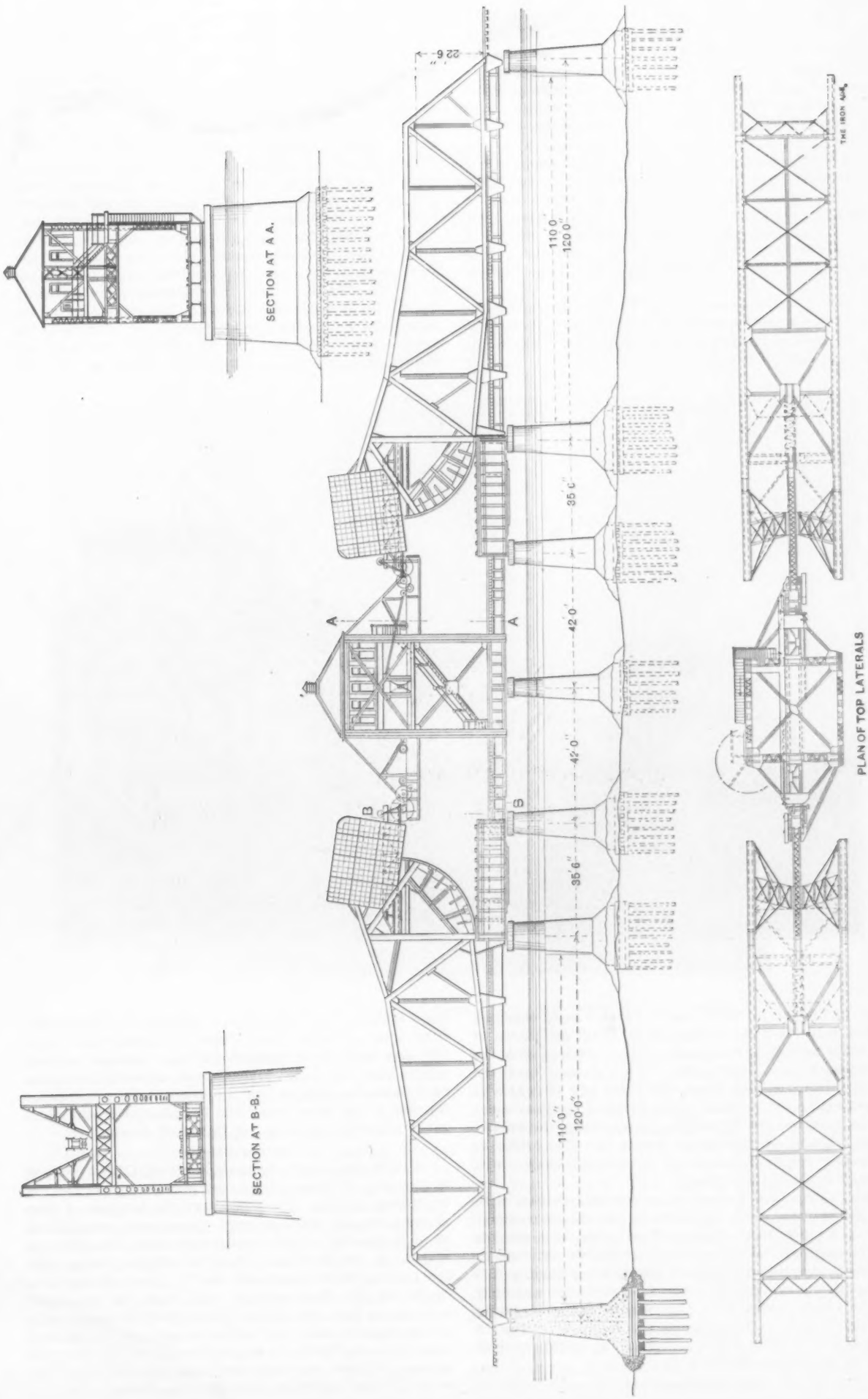



Fig. 2.—Longitudinal Elevation and Plan and Transverse Sectional Details of the Newark Bay Bridge.

driven 53 feet to bed rock. The long dimension of all the piers is 45 feet, but the narrow dimensions vary according to the load. Near the site of the bridge a caisson was built for each pier, the floor of the caisson being constructed of four courses of 12 x 12 inch timbers, which finally formed a grillage resting upon the sawed off tops of the piles about 4 feet above the rock. Within the caisson or box was built a concrete pier, and after the concrete had set the sides of the caisson were removed.

Each span consists of two trusses united by top and bottom lateral systems. To the adjacent ends are held plate segments which, during the raising and lowering of the structure, roll upon the tracks formed on the top of plate girders supported upon a pair of piers. Each leaf is proportioned for a load of two 187½-ton engines on each track, followed by a uniform load of 5000 pounds per lineal foot.

Resting on the center pier is the house containing the operating machinery, which is designed so that the lifts can be operated together or independently. Extending from the house in the direction of each bridge is a power

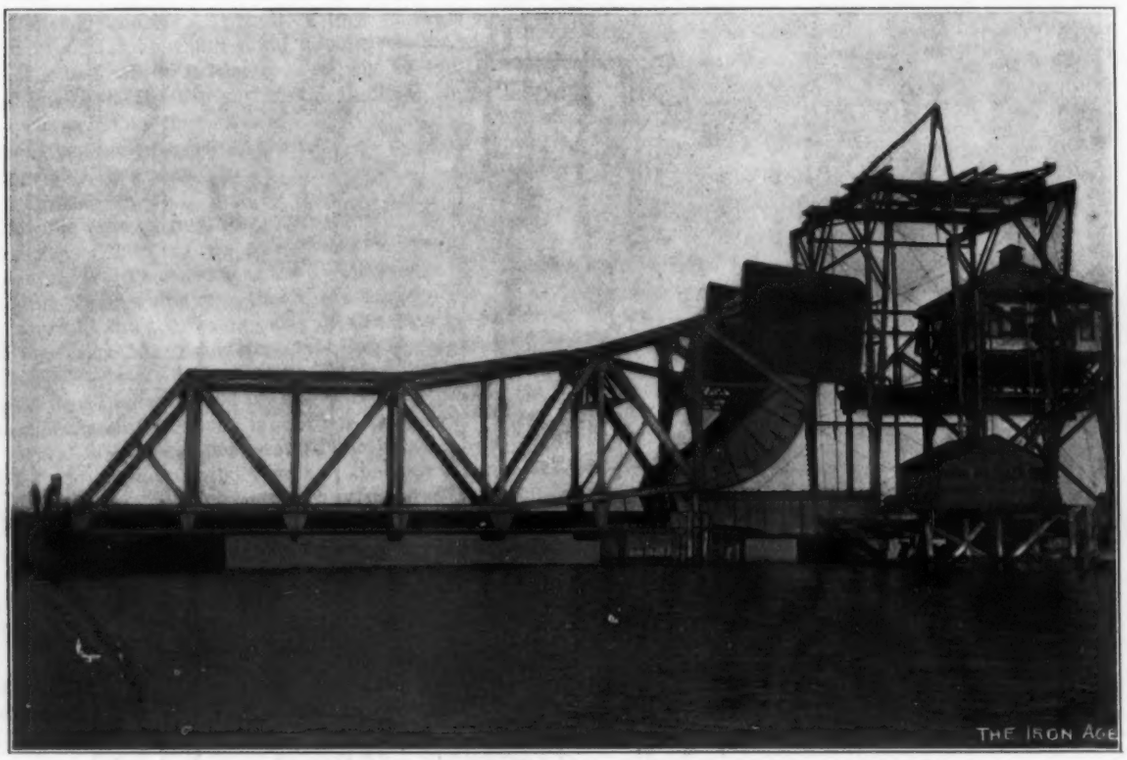



Fig. 3.—One Span of the Newark Bay Double Rolling Lift Bridge in Lowered Position.

shaft having at its outer end a beveled gear engaging with a reducing train of spur gears. The last pinion of the train meshes with a rack kept in contact with the pinion by an idle roller. The rack is formed upon the under side of a light truss, the outer end of which is hinged to the top laterals of the bridge. The movement of the rack toward the engine house raises the bridge, while the opposite movement lowers it. The bridge is accurately counterbalanced with cast iron blocks in a frame just above the segment.

The bridge was erected in a vertical position with the aid of false work, as shown in the first engraving. During erection there was no interruption to traffic, as the trusses were wide enough to clear the old structure.

The bridge was designed by the Scherzer Rolling Lift Bridge Company, Chicago. The superstructure was built by the Pennsylvania Steel Company, and the operating machinery by the Bethlehem Steel Company. The 75 horse-power gasoline engine operating the machinery was built by Fairbanks, Morse & Co.

Not for years have water power plants in New England and the Middle States been so seriously discommoded by the scarcity of the water supply as of late.

## The Canadian Northwest.

TORONTO, December 30, 1904.—In the Canadian Northwest expansion is proceeding at a rate that surpasses any record of progress ever made in this country before. Canada has never been remarkable for "booms," and the few it has had have been of a very partial character, being restricted to some one department of enterprise—such as manufacturing in the earlier days of the national policy—or to some single locality, as at Sydney, in Cape Breton; Sault Ste. Marie, in Northwestern Ontario, or some of the mining towns of British Columbia. Substantial development the country has had, and that appears to be what Manitoba and the territories are having to-day, only in higher degree than any other part of the Dominion ever experienced. In every dimension the West is growing, and growing fast. Its people are spreading over the prairie, its settlements are becoming denser, its production is becoming less simple, its wants have increased with the same velocity and volume as its wealth, and it has now, in its railways, elevators, organized markets, &c., a quasi-public apparatus of very high efficiency for commercial purposes. Population, tilled area, aggregate yield, diversity of production, quantity and quality of demand, railway mileage, railway traffic, clearing house transactions, money circulation, bank deposits, exports and imports all show progress. Not one of the facts that could be taken as a statistical gauge indicates anything but increased development.

### Immigration.

In 1903 immigrants to the number of 128,364 arrived in Canada. Of these the greater proportion went to the Northwest. In the last fiscal year the number of new arrivals was not quite so large, there being some falling off in particular in the immigration from the Western States. In the fiscal year 1903 the settlers coming from the United States numbered 49,473. Most of the newcomers to the West brought with them the means of carrying on farm operations there. They added not only the productive power of their own persons, but a very large amount of cash, to the country's capital. The full measure of their co-operation in the production of the country is not deducible from the crop figures. The immigrants of one year cannot be expected to give a great life to the total yield of the next year. Two or three years must be allowed before any cluster of new settlers

can make much impression on the agricultural output. More than that, the weather of last year was less favorable to the crops than was that of the three or four years immediately preceding it. At the outset of the season the prospects for a wheat crop of 100,000,000 bushels seemed not delusive. But 60,000,000 was the total yield of the wheat harvest in Manitoba and the territories. The great difference between the prices realized for this crop and those obtainable for the crop of 1903 will go far to rectify the error in the calculations made in the spring. A hundred million bushels at the price then contemplated would not return many million dollars more than the 60,000,000 bushels marketable at the present prices. Besides the wheat yield there are other great assets to be credited to the last year's production. Barley, oats, rye, flax, hay and roots figure largely in the season's crop returns. The live stock and dairy products

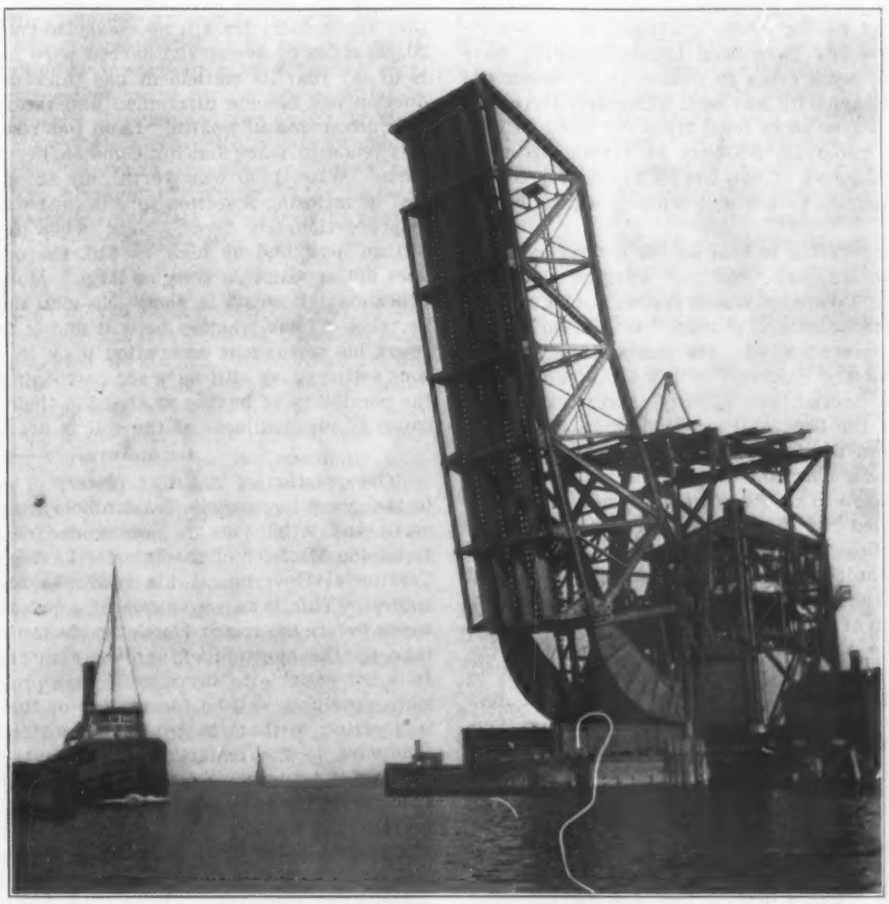


Fig. 4.—One Span of the Newark Bay Double Rolling Lift Bridge in Raised Position.

produced in the fiscal year ending with June probably exceed in value those of the previous year. Under both these heads the wealth of the West advanced remarkably in the last five years.

**Banks.**

A recent marked development in the economy of this country is the extension of the banking service to scores of new points. A feature distinguishing the banking system of this country, as that of Scotland, is the branch arrangement. Instead of an independent small bank being started up in response to commercial demands at some growing nucleus of trade, a branch of a large bank is established there. If the outlook of the place is promising, branches of two or more large banks, whose head offices are in Montreal, Toronto or some other leading city, will be planted there. The banks have always been very conservative. They are careful not to mistake any spasmodic outburst of activity at a given point as evidence of sure and lasting development. That is, they are rather slow to open branches unless they see that stable conditions underlie the smarter trade they see springing up here and there. They are equally cautious about increasing their capital until they are satisfied that there is an actual, permanent need for more money, the bank note circulation in Canada being limited to the amount of the unimpaired paid up capital of the banks. This is now almost exactly $80,000,000. Slow though they have been to take any symptoms of progress as reliable, the banks have had to multiply their branches and increase their capital stock to keep pace with the legitimate growth of the country. In Manitoba and the territories they have opened hundreds of branches. Every knot of settlers bursting into the status of a village in any fruitful stretch of territory has now one or more banks to serve it. Not many years ago the chief business of such branches as were in the West was to distribute there as loans money collected through the parent bank from depositors in Eastern Canada. That is no longer the chief function. The depositors west of the Great Lakes are now numerous and important enough to keep the branches there in funds for the use of all commercial borrowers in that vast field. There could be no more decisive criterion of the growing wealth of the West than this revolution in its financial condition. The vastly increased quantity of money needed for the transaction of its business is stored by its own depositors. The West now finances itself. The country is practically free of mortgages outside its cities and leading towns. Practically all of the swelling surplus yielded by each year's crops is available as new buying power and as new capital for the continued development of the country. In earlier years the net returns from the Western country's agricultural industry were small and went largely to pay debts in the East.

**Railroads.**

The growth of the railroad system and the railroad service of the Northwest is, of course, both a cause and an effect of commercial prosperity there. Until quite recently the railroad was looked upon by the settlers as the public enemy. There was a very thoroughgoing granger sentiment in a constant state of irritation against the

Canadian Railroad. That road's rates do not become subject to regulation until its net earnings exceed 10 per cent. on its capital stock. As the capital necessarily increases with the expenditure for the construction of new lines, terminal accommodations and for increasing equipment, it is not easy for the net earnings to overrun the limit fixed for the exclusion of Government regulation. For many years the Canadian Railroad Company had the problem of meeting expenses to solve. That domestic question naturally took precedence of any policy for building up the country. Since the company began to pay dividends on its common stock, however, it has gone more on the theory that it can most effectually promote its own interests by doing what it can to assist production in its territory. Rates have been reduced, hundreds of miles of branch lines have been built, elevators have been added at shipping and terminal points, roadway has been improved. Since January, 1901, the debenture stock and share capital have been increased by $79,000,000, 769 miles of railway have been built, $12,000,000 has been expended on rolling stock, gradients have been reduced and alignments have been improved, yards have been enlarged in some cases to double their former extent, the elevator capacity has been immensely increased. A second track is now to be built from Winnipeg to Fort William, and a line from Sudbury to Toronto to make the system independent of the Grand Trunk, for connection with the manufacturers and wholesale distributors of Ontario.

An influence operating to spur on the enterprise of the Canadian Pacific Railway Company was the Canadian Northern Railway Company, whose system is fast stretching out into a transcontinental road. It goes on adding to the lines it has acquired. Its competition has not told adversely on the earnings of the Canadian Pacific Railroad, which, indeed, are rapidly increasing as the result largely of the beneficial reaction of its own more liberal policy upon the fruitfulness of the country. The Canadian Northern carried a large part of the wheat crop this last season to its Port Arthur terminal. To its system were added the Manitoba lines of the Northern Pacific. These lines of the American road had been leased by the Manitoba Government for 999 years, and were sublet for the same period to the Canadian Northern, one condition of the contract between the last named company and the Manitoba Government being that the rate on wheat should be reduced. This concession to shippers had, of course, to be yielded by the Canadian Pacific Railway Company as well. Both corporations have so modified their respective tariffs as to bring into their traffic a great tonnage of commodities of low freight classification, trade in which was formerly negatived by the high rates. The change has rendered it possible for the farmers to produce oats and other coarse grains profitably for sale in distant markets.

Great railway projects now on foot are the strongest proofs of confidence in the prospects of the country. To two of these reference has already been made—namely, the double tracking of the Canadian Pacific Railway road between Winnipeg and Fort William and the pushing onward of the Canadian Northern line to the Pacific. Another that is going forward is the road directly joining the "Sault" line at Minneapolis to the controlling Canadian Pacific Railway system at Winnipeg. But of far greater proportions is the Grand Trunk Pacific road, which is to cross the continent from Moncton in New Brunswick to Port Simpson in British Columbia. This road is to traverse a higher latitude in the wheat belt of the West, thus promoting the expansion of the settled area northward. These and like developments tend to attract more people to the country and accelerate its progress.

### The Barbed Wire Test.

A commodity whose increased use may be taken as a rough measure of the rising economic and social conditions in the West is barbed wire. At no former season in the history of the country did the imports of that material ever approach those of last autumn. Usually the fall deliveries at Fort William, sent forward by boat from Cleveland, amount to 2000 or 2500 tons. Before navigation closed last month there were rushed forward upward of 12,000 tons. It was all shipped to the order of Western merchants, to firms for the most part in Winnipeg. So great was the accumulation at Fort William that the freight sheds could not accommodate all the wire, and large quantities were stacked under tarpaulins in all corners of the yards and on the steel docks. Low prices no doubt had a part in swelling out the trade to such proportions. A desire to escape antidumping duties unquestionably hastened and probably multiplied deliveries in the early autumn or late summer, before the duties came into full effect. But the chief cause was the need for the wire. Barbed wire is not among the earliest of farming necessaries in a country like the Canadian West. The purchase of it could be deferred until progress had reached a certain point, when not only would fences be needed but could be better afforded. When settlement ceased to be sparse, when cultivated farm lay beside cultivated farm, and when the raising of live stock became an important department of agricultural production, bounds would have to be defined by fences. To say that the country finds it necessary to construct 15,000 or 20,000 miles of five-strand barbed wire fence in one year is to say that its settlement has thickened, that its production has become diversified and intensified, and that it is advancing in wealth. Land has risen in value, and this tends to make fencing come earlier in the pioneer's plans. When land was worth only $2 or $3 an acre the cost of inclosing a section in a barbed wire fence seemed disproportionately large. Now, when farms are worth $10 an acre and as high as $15, the cost of the fence does not appear relatively so large. More than that, the experimental period is past. No man now doubts when he takes a farm whether he will find it fertile enough to repay his permanent occupation upon it. Whatever reasons settlers may still have for postponing improvements, the possibility of having to abandon their homesteads because of niggardliness of the soil is not one of them.

### Autonomy.

The question of granting powers of self government to the great territories of Assiniboia, Saskatchewan, Alberta and Athabaska is now under consideration, the Dominion Minister of the Interior having signified to the Territorial Government his readiness to confer on the subject. This is in pursuance of a promise made a few weeks before the recent Dominion elections, that he would take up the question of autonomy in the early future. It is not possible to say whether one province or two or more provinces will be formed out of the territories. It is a certainty that the provincial status will be highly conducive to the material development of the country. Instead of being dependent on the vote of the Dominion Parliament for grants of money to carry out State undertakings, the country will be able to look after its own finances, raising funds from its own internal revenues and its own credit as any existing province does. One purpose for which self government will be used is the building of new local railways, as against the purely Dominion railways already serving the country. That will promote material development as the same provincial policy has promoted development in Manitoba. With self government will pass control of the public lands into the hands of the constitutional people of the new province or provinces. After that there can be no Dominion exploitation of such lands for political purposes. Land sales made by the Dominion Government to large speculative corporations do not always turn out to be in the immediate public interest, as the extensive tracts thus acquired at nominal prices are held for prices so high as to retard settlement.

### Trade.

To the manufacturing interests of Eastern Canada, especially of Ontario and Quebec, the opening and filling up of the West have been most beneficial. The thronging of immigrants to the new country meant the annexation of a certain extent of the foreign market. Consumers whose demand could not previously be reached except over a high tariff wall were brought within the domestic market of Canada. The West gave an immense impulse to the industries of the East. But the whole Western trade did not come under Eastern influence. American manufacturers have been aggressive and successful sell-

ers in Manitoba and the territories. The tariff was not a serious obstacle, fence wire, binder twine and a number of other important staples of Western trade being either dutiable at a low rate or entirely free of duty. At present the antidumping duty is something of an additional restriction, but as pointed out in a recent letter to *The Iron Age*, it operates with least severity against shippers from Western American centers. A house in Minneapolis or Chicago has an advantage over one at Montreal or Toronto in the sale of American goods to dealers in the Canadian Northwest. Let us suppose builders' hardware to be the merchandise. It is sold for a price delivered in the Western American cities named. In reselling the hardware to Winnipeg merchants the Minneapolis or Chicago traders invoice the goods at a price minus the transportation charge to Minneapolis or Chicago. Toronto and Montreal merchants are not allowed to do likewise. They paid so much for the goods to the Pittsburgh manufacturer. That price might give them the privilege of free delivery at Minneapolis, but they are not permitted to do business as if they had a distributing branch in that American city. In other words, an element in the invoice prices which is really a freight charge is included for duty. If they show an invoice price below the price regularly quoted for delivery by the American manufacturer, they are penalized under the antidumping clause. This is helping American jobbers in the West as against Canadian jobbers.

### Manufactures.

Manufacturing prospects in the country west of the lakes have changed for the better since Manitoba and the territories took their new start. A criticism of the Sault Ste. Marie industries which was very common even two years ago was that they were too far from markets capable of taking up their output. It is now conceded that the founders of these industries simply took time by the forelock, and that they have a promising outlook in the trade of the Northwest. There was formerly much talk of the cost of shipping the ores of Rainy River country to points in old Ontario, where they could be smelted near the consuming centers. Now we hear of blast furnaces being projected for Port Arthur in order to manufacture for Manitoba, Assiniboia and Alberta. At sundry points in the prairie country itself manufacturing enterprise is putting forth. There is scarcely a doubt that the water powers near Winnipeg will soon become important centers of industry. Brandon is growing into a town of industrial activity.

C. A. C. J.

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A new metal alloy, "radium argentiferum," discovered by Travaglian and Fabiania, two Tuscan engineers, has recently been patented. It is composed of copper, iron and very fine portions of silver, radium and phosphorus. It is claimed to be of greater strength than steel, to be a better conductor than copper, to be nonoxodizable and cheap to manufacture, its cost being about one-tenth that of bronze when made in large quantities. Its discovery is interesting, as it was largely an accident. After the inventors had expended nearly $20,000 in futile experiments, Travaglian, being annoyed by his inability to fuse the metals after hours of boiling, happened to throw a 2-franc piece into the crucible. The coin supplied the needed ingredients for fusion and the problem was solved.

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A projected 30-mile electric railroad in Henry County, Ill., from Kewanee to Geneseo, will use single-phase alternating current. The power house will be situated near Cambridge and will at first have a capacity of 1000 kw. Current will be generated at 2200 volts and supplied at that pressure directly to the central one of the three divisions of the line. For the two end divisions the primary current will be stepped up to a pressure of 11,000 volts and transmitted to substations, where transformers will step it down to the line pressure of 2200 volts. On the locomotives and motor cars the voltage will be again reduced by means of static transformers to 500 volts, at which pressure the current will be used

## The Lake Superior Ore Ranges.

BY DWIGHT E. WOODBRIDGE, DULUTH, MINN.

The Lake Superior iron ore region did a business for 1904 very much larger than was expected by the majority of the trade. Its total for the full year, estimating the all-rail business at 500,000 tons, was as follows in comparison with the preceding 12 months:

*Lake Superior Ore Shipments.*

| | Gross tons. | | Gross tons. |
|---|---|---|---|
| 1904 | 21,843,743 | Decrease | 2,639,239 |
| 1903 | 24,482,982 | Decrease | 3,383,538 |
| 1902 | 27,866,520 | Increase | 7,041,951 |
| 1901 | 20,824,569 | Increase | 1,701,023 |
| 1900 | 19,123,546 | Increase | 871,742 |

These figures include the Michipicoten range, there being not the slightest reason for its exclusion, as seems to be the habit of statisticians. Its ores are sold on American prices; it comes to the extent of its small shipment into direct competition with other Lake Superior ores, and it is melted chiefly in American furnaces. The estimate of 500,000 tons for all-rail shipments of the year is lower than average rail shipments for a series of years, for the reason that there was a comparatively small demand from January 1 of this year to the opening of the season. The movement from mines to local furnaces has been good all year, better than ever before, and but for it the all-rail traffic would be even less than it is estimated. The figures of shipments do not include the new Baraboo region, for it, though a competitor of the Lake mines, is not on Lake Superior. Baraboo shipments for the year have amounted to 50,000 gross tons, all-rail to Chicago.

The totals by ranges for 1904 are as follows. Mesaba, 12,086,878 tons; Menominee, 3,047,096; Marquette, 2,504,951; Gogebic, 2,288,400; Vermillion, 1,299,265; Michipicoten, 117,153; all-rail, 500,000. Comparative figures for 1903 are as follows: Mesaba, 12,892,542 tons; Menominee, 3,741,284; Marquette, 3,040,245; Gogebic, 2,912,912; Vermillion, 1,676,699; Michipicoten, 201,387.

### Course of Trade During the Year.

The year had a bad start. Dullness and despondency had afflicted the iron trade from the preceding fall. Mines had ceased shipments and had retrenched to the last point before the close of November, 1903, so that the year opened on a more depressing situation than had existed throughout the mining region of the Lake Superior country for nearly ten years. Reductions of wages, chiefly, however, by the lengthening of hours, curtailment of operation, the culling out of all men whom it was possible to discharge, had been the order of the day. Mines went into the new year with enormous stocks that it had been impossible or unwise to move forward. That was the condition until the opening of navigation, which was so late that it accentuated the situation, and mines that had prepared to begin shipments in April had to close for the month while waiting for their stock decks to be cleared. A strike of the masters of lake ships shut off marine traffic until about June 15. When the season did actually commence it was without snap. Furnacemen bought slowly, had ore on hand to last them until fall and thought it would be an easy matter to get more whenever they condescended to buy. With a gradual betterment, this condition of things lasted into the late summer. A few furnaces covered their autumn and winter requirements, as they estimated them, and the biggest shippers increased their schedules. But it was not until well along in October that the year's buying movement really started. Furnacemen awoke to the realization that things were better than they had feared and that more iron was being wanted than they supposed. Soon they made inquiries for ore, only to find little or none to be had. Prices had ranged during the summer from $2.25 for Mesaba non-Bessemer to $3.10 to $3.20 for old range standard Bessemer. At these figures the average miner of the cheaper Mesaba could not get a new dollar for the old one he spent. Vessel rates sank to 65 cents for a gross ton from Duluth to Ohio ports, practically 2000 miles of a round trip for a one way freight that netted the ship

only 46 cents. Such costs had not been seen for years. But suddenly the change came, and in October and November furnaces were eagerly seeking ores from the few sellers left to them. Prices on late trades were advanced in many cases 50 cents and more a ton. The incubus of an immense weight of unsold ores pressing on an unwilling market was done away with, absorbed by the furnaces, and the mines revised their schedules, forwarding belated sales. The weather aided them, and shipments were easily continued until December 10, a later date than had been known in the history of the upper lakes.

**The United States Steel Corporation.**

At the beginning of the year it was estimated that the Steel Corporation had enough ore down to supply its furnaces until September, if not another pound should be moved. In 1902 it had moved 16,000,000 tons, the following year approximately 12,000,000 tons. Its ships had a capacity of 10,000,000 tons, and the remainder was chartered in the open market. The late opening of navigation in 1904 reduced the capacity of this fleet by 1,000,000 tons, and the corporation chartered, therefore, about as much outside tonnage as during 1903. It is now building four 10,000-ton ships, and has offered for sale so many of its smaller vessels that its gross capacity for 1905 will be less than in prior years, providing these sales are made. Ore ships sufficient to carry 4,000,000 gross tons are now under construction at lake yards, and will be added to the fleet the coming season. There is no question but they will be ample for any increase in tonnage that can be looked for in 1905. The present fleet was able to move far more during the past year than it was required to handle.

Mention has been made of the activity of furnaces late in the year and of their struggle to find ores for sale. This brings up a factor of the situation that is not fully appreciated by the public, nor apparently by many of those most seriously affected, and that is the small number of merchant ore firms. It is unnecessary to catalogue these firms, but their number is even less than appears. Some are already far oversold, according to best information, on their better ores; others, who may be selling, should conserve every pound they control for associated steel makers; others are such small factors that they cannot be taken seriously. The United States Steel Corporation is not the only ore miner that refuses to sell; some, indeed, are buying. The proportion of free ore—that is, of ore for sale to furnace interests not connected with mines—is far less than is generally supposed.

Labor during the year has been quiet and well disposed. There have been a few strikes on the Mesaba range among laborers employed by stripping contractors, but these were not to be judged by ordinary standards and the men were not altogether to blame. At the beginning of the year there was fear that skilled men employed in open pit mines would demand different conditions, but better counsel prevailed and there was no trouble. Miners have been plenty enough and, except for a lengthening of hours, the larger and more discreetly managed mining corporations did not make any change in wages. The attitude of the United States Steel Corporation, for example, was strikingly altruistic. This concern is referred to simply for the reason that its overwhelming size makes its every act stand in the light. Its position differs little from that of the majority of mine operators. It is fortunate that, with a very few disagreeable exceptions, Lake Superior mining companies are, and have been, remarkably broad, generous and wise.

**The Utilization of Sandy Mesaba Ores.**

Main exploratory activity during the year has been outside the Lake Superior region proper. Indeed, there has been little anywhere, for reasons that have been touched upon in other parts of the review. Mesaba explorations have been chiefly in the western part of the range, where the ores are dry, silicious and feldspathic, and where the problem of their economical preparation for furnace use has been in process of solution during the year. This problem has been to so separate and concentrate the ores that the free silica mixed with the oxide can be washed away, raising the grade of the ore, diminishing its phosphorus content, and giving a product that will be coarser and less dustlike. Progress has been made and there is little doubt that in due time, and by reason of recent improvements in mechanical separation, many millions of tons will be added to the merchantable ores of the Mesaba range. In its possibilities for an increase in tonnage of ores in sight adjacent to lake transportation, and in its bearing on the raw material situation as affecting steel makers with comparatively slight ore reserves, there is no doubt that this is by far the most important development of the year. While no great amount of exploration has been conducted upon these sandy ores, measured by the number of drills at work, the tonnage developed during the year has been of the utmost moment. Leading interests at work there have been the United States Steel Corporation and a group of Duluth and Eastern capitalists working independently under the name of the Canisteo Mining Company. They have selected large tracts after careful examination, and have secured tonnages that may be fairly estimated at from 150,000,000 to 175,000,000 tons of washable ores. Not all of this has been found during the year. The important holding of the United States Steel Corporation is one mine bought recently. It has never been fully explored, but many million tons have been shown. This had been discovered many years before, but had not been recognized as of value. A great share of the holdings of the Canisteo Company was the result of explorations carried on during the winter of 1903-1904.

**The Baraboo District.**

The Baraboo district of south central Wisconsin, doubtless corelated with the Lake Superior region of the Menominee, has "arrived" during the year, and this is a matter of much importance. The Baraboo district has been given a false place in the economy of the ore trade by those who have written of it as either of no value or of high importance as a competitor of Lake Superior. It is neither. It is valuable only for furnaces at Chicago, Milwaukee or some similar points. For these it is a material asset. The district is small, not of high grade and rather costly far mining. In the first place, it is only about 25 miles in extreme length, so far as can be stated now. It is not wide and the ore seems to lie in a lens from 20 to 30 feet thick, dipping on a flattening curve to a considerable depth. This ore lens is composed of two grades, the thickest averaging perhaps 56 per cent. iron and the thinner 4 or 5 per cent. better. Probably there is a thickness of 30 feet that will average 56 per cent. and is non-Bessemer. In character it is indistinguishable from a Marquette soft ore, either in appearance or in furnace operation. It can be put at furnace stock piles at Chicago or Milwaukee at a freight cost that is equal to that for bringing Mesaba ores to Lake Superior. The only mine yet developed in the district is the Illinois, belonging to the International Harvester Company, with furnaces at Chicago. The underground extent of the ore formation may be judged from the fact that during the year a drift has been driven on the main level that cannot be duplicated in any old range Lake Superior mine aside from Chapin, Aragon, Norrie and possibly one other. This drift is more than 1200 feet long, in ore all the way, and is being pushed steadily at either breast. Figuring to the diamond drill holes at other points on the property and close to it, in the way usual on Lake Superior, it is safe to say that this mine contains more than 10,000,000 tons of merchantable ore, perhaps very much more. The Illinois mine made its first shipment in July last, and has now sent to Chicago a total of 50,000 tons. Its product for the coming year will be at a higher rate. The mine is expensive to operate; the cost of pumping alone for the product of the year has been about 35 cents per ton hoisted. As nearly all ore mined has been taken out in course of development, the cost per ton for mining alone has necessarily been comparatively heavy. Very little stroping has yet been done in this mine, but it is well blocked out for mining the coming year.

No other mine is in operation at Baraboo. Rogers, Brown & Co. have one property that has been explored and is ready for opening at any time. The Pittsburgh Steel Company is exploring in the region, but has not

made any move toward development. Logically, this company has no business in the district. Baraboo ore cannot compete in the Pittsburgh market with those from mines on the lake.

**The Aitkin District.**

Exploration has been under way during the year along the line of the Northern Pacific road, about 100 miles west of Duluth, in what is called the Aitkin district. Enough has been done to prove the existence of an ore bearing formation, but little merchantable ore has been found. There are large bodies of paint rock and of ore running from 20 to 40 per cent., and one or two explorers claim to have cut seams that will assay up to 60 per cent. Such ore may be found, to be sure, but the universal consensus of opinion among the best informed mine operators and economic geologists of the region is unfavorable. Still it is not safe to deny the possibility of existence there of merchantable ore in minable quantities. The coming year should decide much as to the merit of this region.

Exploration has been continuous during the year on the famous section 30 63-11, Vermillion range, but results have not been commensurate with the hopes of mining men interested. But one other Vermillion location has been in the hands of prospectors in the year, and there everything was abandoned a short time ago. The operation had been unfavorable. There has been a little work on the Canadian side the international line. On Hunter's Island the International Iron Company has been busy with a drill nearly all the year, and has cut some ore, but has not yet found anything of much importance, either in itself or as a prophecy. Negotiations are now pending that may open the Atikokan district. There has been a little work on the Menominee range, but more in the nature of proving additional ore bodies in old and abandoned mines than in extending the limits of proved territory.

**The Outlook.**

Prospects for the coming year are very bright. The excessive tonnage of ores held at lower lake points since the winter of 1903 has been absorbed and its weight removed from the trade. There is no question that the unnecessary and excessive operations of the mines in 1902 had an important bearing on the subsequent depression all along the line. All mining companies are preparing for heavy business. Many mines are being extensively developed for additional tonnage, both by surface and underground mining. The United States Steel Corporation has half a dozen that will enter the active list this season, either for the first time or for their first full year. Some of these will be enormous shippers; possibly not this season, but soon. Among new mines of the Steel Corporation will be Monroe, Morris, Myers and perhaps one or two more on the Mesaba range. Such mines as Higgins and others that made slight initial shipments the past summer will be active all the year. Stephens, which has been idle through 1904, will perhaps become the large producer that its tonnage and equipment warrant. Among other shippers the Shenango Furnace Company will probably open its large Webb deposit. The La Belle Iron Works will probably open the Wacouta, Swallow & Hopkins their Holland, Pickands, Mather & Co. their Syracuse, and perhaps one or two more they have under negotiation; the Lackawanna Steel Company may open its Scranton; Rogers, Brown & Co. are opening their Monro, and may mine their Susquehanna, while other properties now either developed or idle, as are some of those mentioned above, or yet simply explorations, are very likely to be pushed forward toward the shipping stage during the year.

On March 19. 1904, in a letter to *The Iron Age*, printed the 24th, at a time when estimates of anywhere from 13,000,000 to 15,000,000 tons for the business of the year were almost universal in the trade, I said:

> It is impossible to believe that many of those who are talking about excessively small shipments this year can have put down any figures. Even should the Steel Corporation move not in excess of 8,000,000 tons, the total can scarcely fall below 16,000,000 or 17,000,000. But the Corporation will not thus cut their shipments square in two, and can be depended upon to produce not far from 10,000,000 tons; and the total of the year will be nearer 20,000,000 than the estimates that have been given out by many ore men and shippers.

The Steel Corporation actually did move 11,000,000 tons and the total of the year was 21,793,744 tons. December is pretty early to make an estimate for the coming year, but there is no reason to doubt that ore docks will be well cleaned up by the opening of navigation, and if the country is making up 19,000,000 or 20,000,000 tons of pig iron during the year, three-fourths of which is made from Lake ores, it is not difficult to believe that there must be shipments of from 27,000,000 to 28,000,000 tons. Of this enormous quantity—enormous indeed, though little or no larger than the corresponding total of 1902—not far from two-thirds must come from Minnesota. Looking toward this business, the developed mines, railroads and shipping interests of the State are making arrangements to handle a larger volume than in the past. At underground and surface mines the amount of dead work under way or planned for the immediate future is stupendous, and they will be in shape to respond to any demands, no matter how great. Railroads the past year have shown larger car, train and ship loads, and ton-mile costs have been reduced below any previous records. They are preparing to improve these figures. The two roads in Minnesota owned by the Steel Corporation are spending about $2,000,000 in new equipment and docks and in extending trackage. The ore carrying ships under construction at Lake yards will have capacity for 4,000,000 tons in an average season of lake navigation. Receiving ports on Lake Erie are probably to be fitted with more of the most modern and rapid unloading devices, and railways whose duty it is to move from Lake Erie to furnaces the mountains of ore yearly piled there are as active in their plans for betterment as are those of Minnesota. The one weak link in the chain of ore transportation has been at Erie docks; this improved, and the capacity of the fleet now afloat will be increased 20 per cent.

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The power plant for the electric railways of Reading, England, is described in *Science Abstracts* of the Institution of Electrical Engineers. The boiler plant consists of three Babcock & Wilcox boilers, with 1966 square feet of heating surface and 39 square feet of grate surface, each evaporating normally 5000 pounds of water per hour at 160 pounds pressure, with from 100 to 200 degrees superheat. A Green economizer, containing 240 tubes, is used for heating the feed water, this being supplied by a Weir steam pump of 15,000 pounds capacity, an electrically driven triple ram pump and two automatic injectors. Underfed stokers are used, and mechanical draft is furnished by two fans. The chimney is of the Custodis radial brick construction, 150 feet high and about 9 feet in diameter at the top. The engine plant includes four Browett-Lindley 11½ and 18 x 8 inch high speed engines, running at 420 revolutions per minute and developing 150 brake horse-power. The engines exhaust into surface condensers containing about 400 square feet of surface. Cooling water is circulated by two motor driven pumps, each having a capacity of 22,500 gallons per hour. The engines are direct connected to 100-kw. Westinghouse generators, delivering current at 550 volts. There is also an auxiliary generating set of similar type with a capacity of 25 kw.

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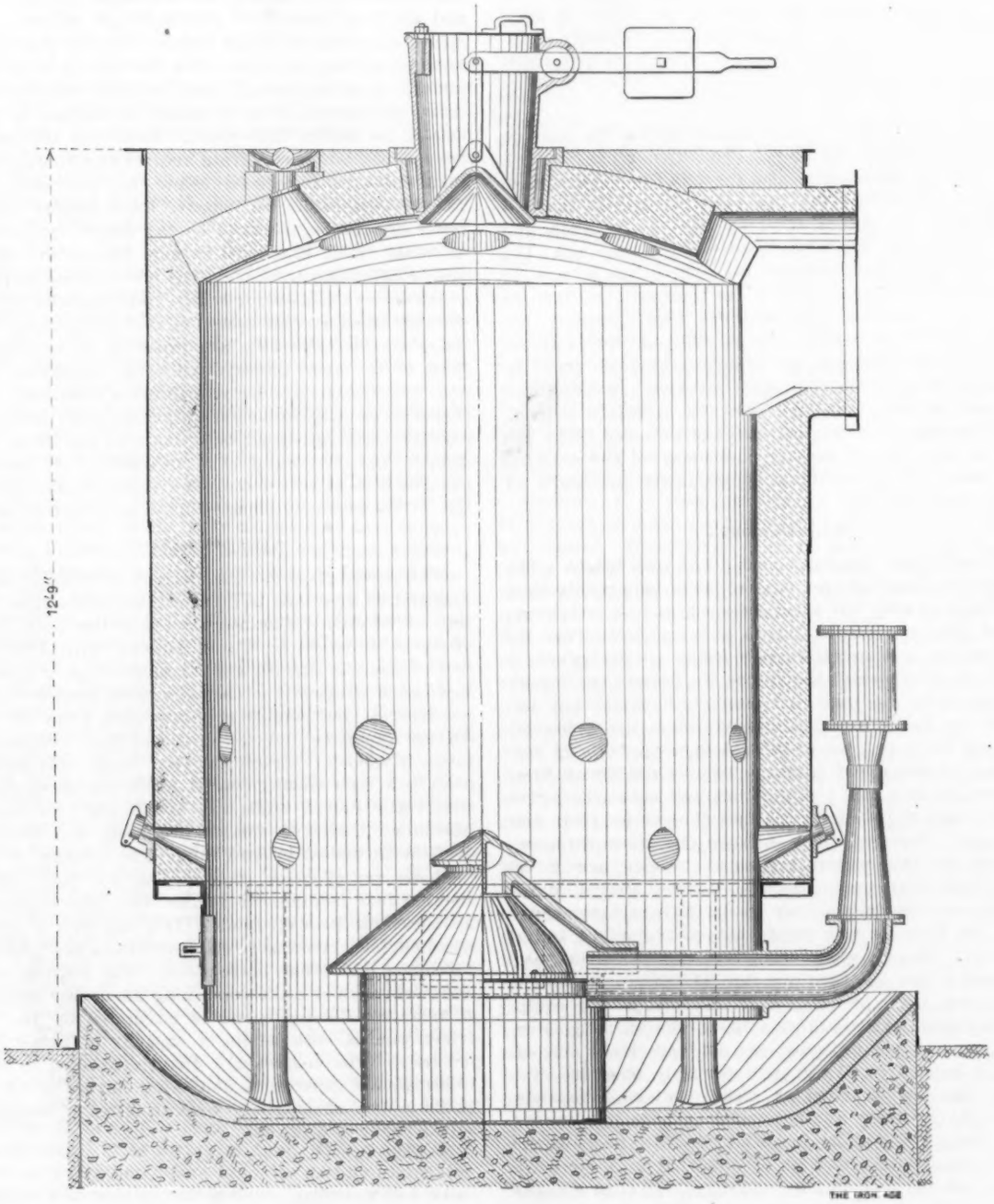
In a new method devised for driving and regulating clocks electrically a selenium cell in an exhausted pear shaped bulb is placed in the focus of a parabolic cylindric mirror, so that the light from an incandescent lamp can impinge upon the cell whenever a seconds pendulum passes its lowest point, at which a slit in a card fastened to the pendulum coincides with a slit on a fixed screen. The effect on the selenium is made to actuate an electromagnet, placed just to one side of the point of highest velocity, to take account of the lag of the cell, so that an impulse is imparted to the pendulum at the right instant. A clock thus operated has given satisfaction and has demonstrated that an electric clock without contacts can be made.

## The Amsler Gas Producer.

The Amsler gas producer illustrated herewith is of what is known as the continuous type, in which the fuel is fed through a bell and hopper, and the ashes removed through a water seal, so as not to interrupt the output of gas. No grates enter into its construction, neither does it require false bars nor fire cleaning doors. Its construction prevents air from passing up the side of the producer to burn the gas above the fuel. The air distributer introduces the air thoroughly throughout the bed of ashes below the fuel, so that the fuel is completely consumed, and when the ashes are taken out they are cooled to almost the outside temperature. All the gashouse more comfortable. Aside from the six poke holes in the crown of the producer there are 16 additional poke holes staggered around the sides. These are used as sight holes, so the fuel may be kept even, and they are also used to dislodge and break up clinkers and to prevent holes from forming in the fuel bed. They are at a hight conveniently accessible from the floor. In addition to the poke holes there are doors in the ash apron for the removal of large clinkers such as are troublesome to remove through the water seal. The doors are also useful in affording access to the producer for inspecting or repairing.

As the ash pan is circular in shape, it allows the ashes to be removed from any side of the producer, so




Sectional Elevation of the Amsler Gas Producer.

of these are features which contribute to a large gasifying capacity for the bosh area. The air is supplied by one large blower because it requires less steam for the same quantity of air blown into the producer than do a number of smaller ones. The air is introduced through the pipe above the water so as to prevent condensed steam from collecting and trapping off the air supply.

To minimize the radiation loss the producer is of circular cross section, giving it the least surface for a given volume of fire. The top is inclosed by a brick dome, which also reduces the radiation loss and makes there is no trouble in keeping the fuel bed level and the depth of the fire uniform throughout. The cleaning operation is so simple to perform that one man can care for quite a number of producers.

It will be noticed that the construction of the producer is simple and that the sides are straight all the way down to the ashes. As there are no projections on the side of the brick work for the poker bars to encounter, clinkers may be conveniently removed. The producer is manufactured by the Amsler Engineering Company, Empire Building, Pittsburgh, Pa.

# The Revision of the Tariff Law.

## Prospect for Action and Probable Method of Procedure.

WASHINGTON, D. C., January 2, 1905.—Some of the uncertainties that surrounded the situation with respect to prospective tariff legislation during the early days of the current session of Congress have recently been cleared away, and it is possible to make a tolerably definite statement with regard to the Administration's plans for the overhauling of the Dingley schedules. The subject is of unusual importance at this time, for the reason that a number of collateral issues are involved, including the establishment of a new basis for reciprocity treaties, the revision of the drawback law as found in section 30 of the Dingley act, the determination of a new policy with reference to the taxing of alcohol for industrial purposes and the comprehensive amendment of the Customs Administrative act of 1890, in which many incongruities have been developed as the result of the execution of the McKinley, Wilson and Dingley tariff acts thereunder.

### No Spring Session.

The President has finally and definitely abandoned his original purpose to call Congress together early next spring for the purpose of enacting a new tariff law. This decision has been reached after conferences with the leaders of both houses and with many manufacturers and other business men, some of whom earnestly advocate revision, while others insist that the continued prosperity of the country depends upon the maintenance of the Dingley rates. In reaching this decision, however, the President has been moved by considerations of expediency with reference to the most convenient time for calling Congress together, and has not by any means abandoned the project of an extra session during the coming recess. On the contrary, he is now of the opinion that Congress should be summoned to meet next fall, about October 1, under conditions that will insure the enactment of a new tariff law before December 4, the date of the convening of the first regular session of the Fifty-ninth Congress.

In reaching this conclusion the President has been moved by urgent representations of the House and Senate leaders that, without regard to the necessity for tariff revision, it would be a mistake to call Congress together for that purpose early in the coming spring. The work of the current short session is unusually heavy and will occupy the parliamentary managers of both houses until March 4, and will be rendered especially arduous by the elaborate inaugural ceremonies, the preparations for which will take much time during the last month of the session. No preliminary work on the revision could be begun, therefore, until after adjournment. There would of course be a general demand for extended hearings before the Ways and Means Committee, and as there is urgent demand for the revision of nearly every schedule of the present law these hearings would undoubtedly occupy several weeks. At least a month or more of the spring session would thus be devoted exclusively to committee work and the passage of the new law would probably be delayed until long after the beginning of the new fiscal year.

### Advantages of October Session.

Should Congress be called together in October, however, much preliminary work could be dispatched before the date of meeting. It is customary for both the Ways and Means and the Finance committees to receive authority to sit during the Congressional recess, even though no project of tariff revision is in prospect, and acting upon such authority hearings could be held and complete bills drafted before the meeting of the special session. Much time would thus be gained by both committees, for it should be understood that in all revisions of the tariff made in recent years the Finance Committee has prepared an independent bill differing materially from that of the Ways and Means Committee and the differences have been harmonized subsequently in Conference Committee. The proceedings in the House would probably not occupy more than a week, as, following the practice which came into vogue when the so-called Reed rules were adopted, all important measures are now considered under a special order limiting the debate, excluding all amendments opposed by the majority leaders and setting a time for a final vote. This fact should not be lost sight of by those interests desiring changes in the tariff, for if such modifications are not secured at the hands of the Ways and Means Committee little opportunity would be afforded to obtain them through amendments offered in the House and the only hope would be to appeal to the Senate Finance Committee.

The tariff commission idea has rapidly gone out of favor since the beginning of the present session. It has been advocated as a method of "taking the tariff out of politics" and as relieving Congress of the preliminary work of drawing a tariff bill. The difficulty, however, is that the leaders of both houses do not desire that the tariff shall be taken out of politics and they are decidedly unwilling to seriously consider a bill drafted by a non-Congressional commission, however such a body might be constituted. It is doubtful whether any time would be saved by referring the subject to such a commission, as the measure thus framed would carry very little weight with either branch of Congress and would hardly serve as a framework upon which the Ways and Means and Finance committees would construct their own measures. It is difficult to overestimate the reluctance of the men who have made the tariff laws since 1883 to surrender any part of their functions in connection with a thorough revision of the present law.

### A Popular Commission Plan.

There is one commission proposition, however, that is attracting some favorable attention—namely, the resolution introduced early in the present session by Representative Fordney of Michigan, the principal features of which are as follows:

*Resolved*, That a commission is hereby created, to be called the "Tariff Revision Commission," to be composed of ten Republican members of the House of Representatives of the United States, to be appointed by the presiding officer of said body.

Sec. 2. That it shall be the duty of this commission to investigate and to report to the House of Representatives on the first day of its next regular session—namely, December 4, 1905—what legislation, if any, is desirable to change the existing tariff laws of the United States.

Sec. 3. That the commission shall give reasonable time for hearings, if deemed necessary, and if necessary it may appoint a subcommission or subcommissions of its own members to make investigation in any part of the United States, and it shall be allowed actual necessary expenses for the same.

Those who regard this proposition with favor suggest, however, that it should be amended so as to include an equal number of Republican Senators, which would be equivalent to creating a Congressional commission composed of the leading members of the Ways and Means and Finance committees. In support of this resolution it is urged that such a commission, with an adequate force of clerks and experts, would be able to make more rapid progress than could be made by the Ways and Means and Finance committees acting either separately or jointly. As time is an important factor in any scheme of tariff revision, there is considerable speculation as to the date upon which the tariff law enacted at a special session to be held in the fall would take effect. The experience of the past 20 years has demonstrated that it is advisable that changes should take effect almost immediately after the passage of a new tariff law, in order that business may not be brought to a standstill pending the going into force of the new rates. In this connection it is suggested that if the tariff should be revised at an October session it might go into force as early as December 1, or at the beginning of the new year if it should be deemed advantageous to defer its taking effect until that date. The last three tariff revisions went into force on October 6, 1890; August 28, 1894, and July 24, 1897, respectively. It is claimed that it will be more advantageous with respect to the bulk of importations that any revision should take place on or before July 1 or not until the beginning of the next calendar year.

### Activity of Treasury Officials.

That the Administration is planning for the early revision of the tariff is evidenced by the unusual activity

of Treasury officials in gathering material bearing upon the subject. Secretary Shaw is taking a lively interest in the matter and is making a personal investigation in an altogether unprecedented fashion. It should not be understood in this connection, however, that the Secretary of the Treasury, who, by the way, cannot be regarded as a tariff expert in any sense, is acting as the President's representative in the inquiry he has set on foot concerning the desirability of modifying certain of the tariff schedules. It is not customary for the Treasury Department to make recommendations to Congress regarding tariff rates, and it is to be feared that scant courtesy will be shown by the tariff leaders to any suggestions that may be made by the Department. The Secretary's plan for tariff revision "by piecemeal," which has been somewhat widely advertised, does not represent the President's views, as Mr. Roosevelt's ideas are far more comprehensive. At the Capitol this scheme is ridiculed as wholly impracticable and as likely to cause the maximum of disturbance to the industries of the country. Nevertheless, Mr. Shaw's inquiry is a matter of interest to all manufacturers, as the Department's views will necessarily attract considerable attention and will form the basis of more or less discussion in Congress.

The Secretary has requested each member of the Board of General Appraisers to forward to the Department, upon forms which he has furnished, a statement of views as to the desirability of modifications both with respect to rates and classification. General Appraiser Sharretts, who is conceded to be the best informed member of the board upon the general subject of the tariff, has recently spent some time in Washington conferring with Secretary Shaw and also with certain members of the House and Senate, and it is probable that in any revision that may be undertaken in the near future Mr. Sharretts will act in the capacity in which the late General Appraiser Tichenor served the Finance Committee in the framing of the McKinley, Wilson and Dingley tariff bills. Mr. Sharretts is especially well informed with respect to all questions relating to classification that have arisen under the existing tariff, and will be in position to suggest changes in phraseology that will obviate much trouble in the future.

### The Iron and Steel Schedule.

The iron and steel schedule is greatly in need of revision in the matter of classification, as is evidenced by the numerous controversies that have arisen with regard to the dutiability of steel plates, strip steel, wire rods, &c., which the Board of General Appraisers and the courts have determined in a manner not altogether satisfactory either to domestic manufacturers or to importers or consumers. The industry has made considerable progress in technical development since the Dingley law was enacted, and the adoption of new processes has rendered certain classifications obsolete and entirely misleading. Like conditions prevail in other industries, and an important feature of the proposed revision will be the rewriting of the text of the law without reference to any changes in the rates that may be made.

### Reciprocity and the Tariff.

The subject of reciprocity is so closely allied with the tariff that the Congressional leaders are already giving some thought to the matter of devising a basis for the negotiation of treaties under the projected revision. The Dingley tariff act contains two important provisions authorizing reciprocity treaties—namely, sections 3 and 4—under which all conventions now in force and the 12 or 15 that have been concluded but not ratified were prepared. Section 3 delegates to the President the power to conclude and proclaim treaties making certain specified concessions in exchange for reciprocal favors, but the articles are unimportant, including only argols, brandies, wines, works of art, &c. Several conventions have been promulgated under this section and have operated to the satisfaction of the Government and the importing interests affected without in any way embarrassing domestic producers.

Section 4, under which all the pending unratified treaties were concluded, has proved of very little practical value. It is regarded by experts in constitutional and international law as being a superfluous piece of legislation, merely declaratory in effect, for while it authorizes the President to conclude treaties making reductions not to exceed 20 per cent. in the schedules of the Dingley act, such treaties are required to be submitted to Congress for ratification. There seems to be little doubt that the President may at any time, without reference to section 4, negotiate a reciprocity treaty, provided of course it is subsequently submitted to the Senate for ratification, and to both House and Senate for the passage of the necessary legislation to put it into force. The best evidence that section 4 is almost meaningless is the fact that its provisions expired two years after the passage of the Dingley act, or on July 24, 1899, and that the President did not hesitate long after the expiration of this limit to negotiate a treaty with Cuba cutting down the Dingley rates on all Cuban products.

### Diverse Views on Reciprocity.

A division of sentiment exists in Congress as to the desirability of any legislation authorizing reciprocity treaties, but the more conservative leaders believe that some basis for treaties should be established in any revision that may be made. Conditions may change, it is urged, and whether immediate advantage is to be taken of such a provision or not, it is pointed out that no tariff system is complete which does not contemplate the possibility of reciprocal reductions for the extension of foreign trade. There is, of course, no possibility that any of the pending reciprocity treaties can be ratified, and as all of them have expired by limitation, they will be permitted to die at the close of the current Congress and no attempt will be made to revive them. It is probably true that the majority of these conventions are today obsolete, all of them having been negotiated more than five years ago. It is manifest that it would be vastly better to conclude new treaties than to attempt to extend these rather antiquated conventions.

### A Minimum and Maximum Tariff System.

The subject of reciprocity is associated with a project to which some attention has been given by Congressional leaders—namely, the adoption of a maximum and minimum tariff system such as is in use in the leading European countries. Such a system affords excellent facilities for the negotiation of reciprocity treaties and is looked upon with some favor by such prominent leaders as Senators Aldrich and Allison, who have made a special study of our foreign trade relations. It is assumed that, should this system be adopted in the coming revision of the tariff, the maximum rates would be those adopted for the general tariff and the minimum or reciprocity rates would represent such reductions as Congress might be willing to authorize in exchange for satisfactory reciprocal concessions from foreign countries. One important advantage of the maximum and minimum system is the fact that in the case of each item of the tariff schedules Congress would determine in advance the exact amount of reduction to be made by treaty, such reduction being carefully adjusted to the prevailing conditions in each industry. After the enactment of such a tariff the conclusion of reciprocity treaties would be comparatively simple, as the President would be authorized to proclaim them without again bringing them to the attention of Congress. The United States Supreme Court has upheld the constitutionality of this method of procedure in the case of the Blaine treaties and, to a limited extent, the conventions negotiated under section 3 of the Dingley act, which are now in force, illustrate the same principle.

### Drawback Reform.

It is now generally conceded that nothing will be done in the way of amending the existing drawback law until the tariff act is comprehensively revised. The question will then be brought sharply to the attention of the Congressional leaders, as the present statute constitutes section 3 of the Dingley act. The advocates of the Lovering drawback bills will urge their enactment in place of section 30, but whether the project embodied in these measures is adopted or not there is every reason to believe the statute will be liberalized in several important particulars. With a view to simplifying the work of revision Mr. Lovering has separated the most important

provisions of his original measure and has incorporated them in four new bills which he has introduced at the present session. The first of these bills relates to the allowance of drawback and remission of internal revenue taxes on articles consumed on vessels clearing for foreign countries; the second provides for drawback of duty paid on coverings, wrappings, containers, &c., used on products intended for export; the third modifies section 30 by extending its provisions to articles which have been "produced" in the United States, the object being to permit drawbacks to be paid even where the process through which foreign materials pass may not be regarded strictly as a manufacture, and the fourth bill embodies the so-called substitution provision, which waives the identification of the imported material in goods offered for export where it can be shown that the materials used in production "at least equal in productive, effective and manufacturing value an equal quantity of the material required to produce such article or articles," provided the producer can show that he has either imported or purchased sufficient foreign materials to make the goods offered for export. While there is some difference of opinion as to the desirability of certain of these provisions, there is much unanimity in the contention that the present law is wholly ineffective and should be amended along very liberal lines as soon as possible.

#### Alcohol for Industrial Uses.

The proposed revision of the tariff will be undertaken with great solicitude as to the revenues to be derived therefrom, and in this connection the internal revenue laws will probably be quite as thoroughly overhauled as the tariff duties. Such an overhauling will furnish an opportunity for the consideration of a comprehensive policy with reference to the use of alcohol for manufacturing purposes, a matter that is coming to be regarded as one of the most important Governmental problems of the day. Every important European country now grants denaturized grain spirits for use in the industrial arts practically free of tax, and the enormous impost on grain alcohol in this country, which makes the price about $2.60 per commercial gallon, as against 15 or 20 cents abroad, is a very serious handicap to many important industries and completely shuts American producers out of a very desirable foreign market. At the present time there are two bills pending before the Ways and Means Committee on this subject, one of which reduces the tax on pure grain spirits from $1.10 to 70 cents per gallon, while the other allows the use of denaturized grain alcohol free of tax for domestic or industrial purposes. A very strong effort will be made to incorporate these two propositions in the new tariff law, and judging by the hearty co-operation promised by the leaders of both Houses, there is every reason to believe that American manufacturers will not labor very much longer under the great disadvantage they have suffered in their attempts to extend their foreign trade, because of the antiquated internal revenue system which has been in force in this country since the first law was enacted placing a tax on spirits of any kind.

#### Revision of Customs Administrative Act.

The readjustment of the tariff will also furnish a favorable opportunity for the revision of the Customs Administrative act of June 10, 1890, which was passed by Congress for the administration of the McKinley tariff law. While this act as a whole had proved to be a singularly efficient piece of legislation, nevertheless the past fourteen years have developed a good many shortcomings, especially as the practice of importers has materially changed in many important respects. Three important features are embodied in the leading projects for the revision of the Customs Administrative act: First, the fixing of a limit for the assessment of additional duties for undervaluations; second, the elimination of the jurisdiction of the United States Circuit Courts in customs cases, so as to provide that appeals may be taken directly from the Board of General Appraisers to the Circuit Court of Appeals, thereby greatly facilitating customs litigation, and third, the exact determination of the jurisdiction of the Treasury Department over the Board of General Appraisers and the measure of autonomy to be granted the board. A bill covering certain of these features has already passed the House, but has been held up in the Senate Finance Committee and will probably not be further considered until the tariff is revised.

#### Philippine Tariff Problems.

There are many Senators and Representatives who do not sympathize with the Administration's "open door" policy with reference to the Philippines, and who insist that preferential rates should be granted to American products in the tariff on goods imported into the islands. The preferential system is claimed to have resulted very advantageously in the case of Great Britain and her colonies, and there is little doubt that with a preference of 30 to 40 per cent. in favor of American products the entire trade of the islands would soon be monopolized by our manufacturers and exporters. A demand will be made to incorporate a preferential provision in the new tariff, but all the influence of the Administration will be thrown against it, as the State Department takes the view that the political importance of the "open door" principle in the Orient is greater than the combined commercial considerations, a view that is fully shared by the President and the majority of his Cabinet.

W. L. C.

## International Competition in Britain.

BY S. G. HOBSON, LONDON.

It is not a little remarkable that, notwithstanding the vigorous fiscal campaign over a period of more than a year, we are not one whit the wiser as to either the nature, the extent or the effects of foreign competition in the home market. Statistics are always expert liars. We have been flooded with statistics, and in consequence the average man does not know what to believe. On this account it may further be observed that the intermixture of politics with business is not conducive to a right understanding of the subject. A few general observations may be useful before proceeding to discuss international competition in the iron and steel trades in this country.

#### Character of British Imports.

All assertions to the contrary notwithstanding, it may confidently be affirmed that Great Britain easily holds her own both in manufacture and in commerce. The value of imported articles, wholly or mainly manufactured, bought by Great Britain in 1904 was about £135,000,000. This would seem at first blush as if foreign manufactures were obtaining a firm footing in the British market. But if we analyze these figures it is instantly discovered that nearly all our imports under this heading are purchased for further manufacturing processes. Thus, iron and steel are seldom bought completed. We purchase metals to the extent of about £20,000,000 (the final figures are not available as I write), all, of course, as raw material. Then, again, from the sum total must be taken about £40,000,000 worth of yarns and textile fabrics, all clearly imported for manufacturing purposes.

Of a sum total, therefore, of imports valued at £550,000,000, finished manufactured material cuts a very small figure. Of the total imports over £230,000,000 worth is for foodstuffs, £180,000,000 for absolutely raw material and £135,000,000 for manufacturers' raw material. An example of this proportion is easily stated in Great Britain's trade relations with the United States. In 1902 manufactured goods from America imported into this country amounted to over £20,000,000, but the total of imports from America was nearly £130,000,000, the percentage of manufactures to total imports being 16. It is therefore evident that the foreign manufacturer has as yet made but little impression upon British industries.

#### The British Manufacturer Efficient.

And this brings me to the vital question: Is the British manufacturer as skillful, as alert, as up to date as his German and American competitors? Just as you

cannot indict a nation, so to this question there can be no absolute answer. In the main, however, it may be said with truth that the British manufacturer is not such a fool as so many irresponsible scribes like to make him out. Take the motor car industry as an example. It cannot be doubted that there are both German and French makers who can produce a motor car superior to anything to be obtained in British shops. There are reasons for this into which I need not enter. But if you would buy a motor car at a fixed sum, say £750, there are a number of British makers who can hold their own with all comers. And here we come to the kernel of the problem. As a general rule the British manufacturer fights shy of extremely scientific methods. He aims rather at a high average. Now, in the manufacture of motor cars, if perfection is to be obtained, the highest scientific efficiency is requisite in every part—the weight of aluminum, the length of the piston stroke, the exact composition of nickel steel, the length of the springs in relation to the resiliency of the tire, the total weight of the car, the exact economic effect of fuel, and a hundred and one other important points. In these important details greater accuracy has been attained by, here, the German maker and, there, the French maker; but in average efficiency the British maker compares favorably. It is being perpetually pointed out in the public press that a German invention has revolutionized some industry or that an American one has changed the whole aspect of affairs. In pure science both Germany and America score heavily (with certain notable exceptions), but in the general application of science to industry the British manufacturer speedily follows his competitors and, more important still, avoids their mistakes.

Two striking instances may be quoted: A few years ago the expansion of the German market was universally talked of. The man in the street insisted that British trade was going to the dogs, that the race had been run and lost. What really happened was that Germany opened up a number of new markets, spent untold thousands in new designs for the new markets, and finally found only a small residue of remunerative trade. The British manufacturer waited until he knew what were the successful lines, and in a short time was competing with greater or less success. All the experimental expenditure had been done by the German competitor. The second instance affects America. Ten years ago the American machine tool was all the rage. At that time you could go through the cycle shops of Birmingham and Coventry and find them literally filled up with American machines. To-day the British machines have supplanted the American. Let us, then, dismiss from our minds the all too prevalent notion that British industry is in a state of decadence.

**The American Supply Capricious.**

I now come to a more pertinent question: Why have the British machine tools so largely supplanted American machine tools in the British market? *Ex uno omne disces.* The machine tool trade is typical of all. I do not hesitate to say that the fault—if fault it be—rests almost entirely with the American. It may be summed up in the phrase, capricious supply. If ten years ago American makers had fully made up their minds to hold the British market they should never have permitted good times in America to draw them from their purpose. About 1898 American agents in this country were building high hopes upon a great trade. They could sell their goods, but could not obtain deliveries. I do not exaggerate when I say that a hundred capable agents in this country have in recent years thrown up their American connections in despair. There is a pendant to this: those American firms who maintained supplies are almost without exception doing a good business in Great Britain to-day.

So far as American machine tools are concerned it may be remarked that in general they are far too lightly built for British requirements, and American makers were too busy to send along the machine in demand. The British machine tool makers were quick to seize their opportunity. American machine tool makers who have kept close tab on British requirements are doing well. If the ten thousand angry cablegrams which have been sent to American makers from British agents during the past five years could be published in a volume they "would a tale unfold!"

Coming more particularly to the iron and steel trades, the chief countries whose products are marketed in this country are Sweden, Germany, Holland, Belgium and America. Germany sends to us sewing machines and about £3,000,000 worth of other machinery. Belgium sends us guns, bar iron (over £500,000 worth); nearly £700,000 worth of girders, beams and columns; over £300,000 worth of machinery, and in addition nearly £2,000,000 worth of unenumerated iron and steel products. British trade with America runs on larger figures so far as imports are concerned, mainly owing to our heavy purchases of copper, which may be valued at about £3,000,000. Apart from copper we buy from America nearly £4,000,000 worth of various goods of iron and steel manufacture. It may come as a surprise to many Americans to learn that the American trade in leather in Great Britain exceeds the trade in iron and steel. In greater detail, the iron and steel imports of Great Britain include wrought iron bars, angles, rods, beams, columns, steel bars, angles, plates, hoops and strips, wire rods, nails, screws, rivets, bolts and nuts, iron and steel rails, tires and axles.

I doubt whether the advent of the United States Steel Corporation has facilitated trade with this country. It may well be that in former days much of American imported iron and steel was sold at a loss. The trade, under the direction of highly concentrated capital, has possibly evaded this loss. But a good deal of the decline of the American iron and steel trade with Great Britain must be set down to the more arbitrary business methods adopted by the corporation. Oversea bargaining necessarily involves considerable give and take, both in regard to price, shape and delivery. The large corporation cannot "argle-bargle." But the result has been that many an order which would have gone to America has been snapped up by the small British maker, whose powers of negotiation were limited only by his purse. The proposed agreement which the United States Steel Corporation sought to impose on British merchants last year stirred up considerable resentment. The merchant who can pick up good bargains in any iron and steel area in America may generally be sure of an equally good bargain over here, presuming he has a connection.

In conclusion I would offer this general comment: There is a tendency observable in America to look upon British markets as auxiliary to American requirements. As long as this spirit prevails there will be no permanence in the trade connections, in this country, of American makers. All British orders should receive equal attention with American orders and be filled *pari passu*. I should not insist upon this if British orders were merely for British consumption, but London is not only the greatest financial center in the world, but also has in it live buyers for all countries of the world. In particular I would direct attention to the increasing trade Great Britain does with its colonies, the advance being in the last ten years as from 34 to 48 per cent. Finally—take my opinion for what it is worth—no American manufacturer need hesitate to push business in this country, fearing, in the near future, the imposition of an import tariff. It is my deliberate conclusion that, for weal or woe, Great Britain has made up her mind to continue her free trade system.

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It has been found that a rod of tin-aluminum alloy, when filed and plunged in cold water, gives off a gas composed of hydrogen and oxygen in explosive proportions. An unfiled rod, on the other hand, has no action unless the water is boiling. This peculiar behavor of the metals may be explained by the different states in which they exist. It is believed that the aluminum and tin form a true alloy only at the surface of the rod, so that by filing an almost infinitestimal number of junctions of the two metals are laid bare, and act as thermo couples, thus producing the galvanic action noted.

## The Lackawanna Slabbing Mill.

The slabbing mill recently installed and now in successful operation at the works of the Lackawanna Steel Company, Buffalo, N. Y., in capacity, weight and massiveness of construction surpasses anything yet undertaken in the line of rolling mill machinery. Massiveness of construction is becoming more and more appreciated by users of rolling mill machinery, as it is realized that this property imparts an anvil effect to a mill, which enables it to safely withstand the shocks and strains incidental to the severe work imposed by the large reductions which are necessary for the production of the tonnages demanded from the modern mill. An examination of the illustrations here presented and an inspection of the appended statement of the weights of some of the principal parts will convey an idea of the massiveness of this mill:

| | Pounds. |
|---|---|
| Weight of shoes | 355,270 |
| Weight of shoe girders | 153,750 |
| Weight of vertical roll housings | 180,000 |
| Weight of horizontal roll housings | 254,000 |
| Weight of pinion housings | 140,000 |

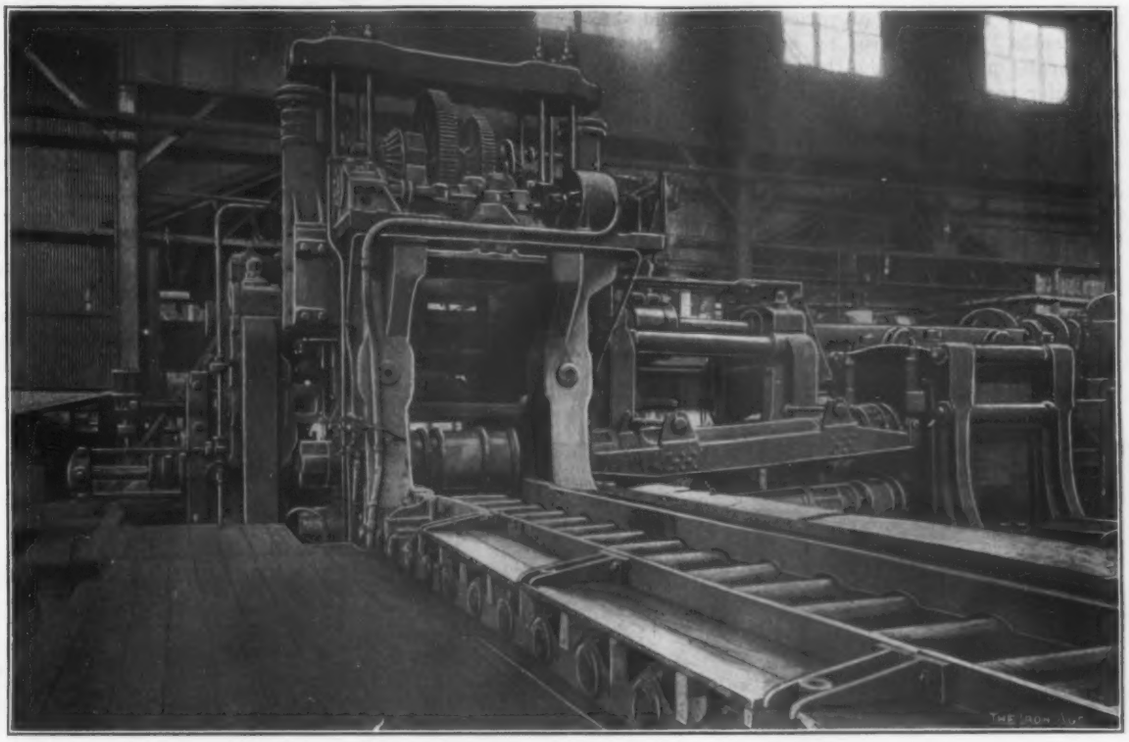


Fig. 1.—General View of the Mill.

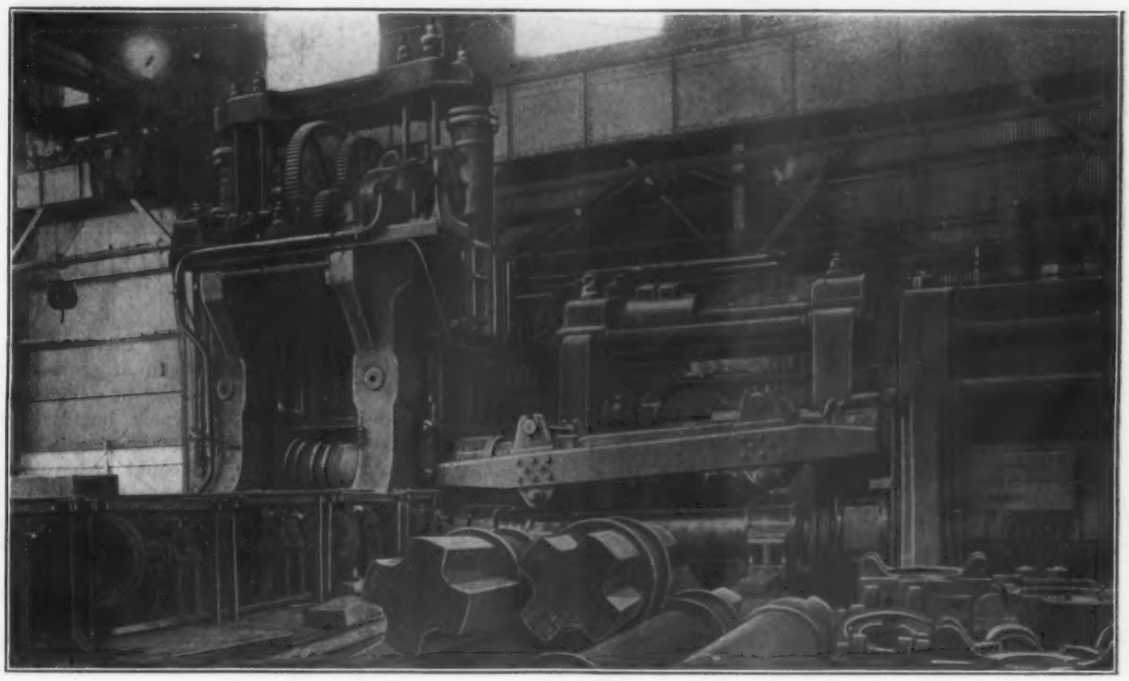


Fig. 2.—View Showing the Manipulating Device.

THE LACKAWANNA SLABBING MILL.

The total weight of the mill, tables and engine is 4,200,000 pounds, or 2100 net tons. Figs. 1 and 2 are views of the mill, and Fig. 3 is a view of the reversing engine.

Not only is massiveness of construction in mills of this type becoming appreciated, but the advantages of the slabbing mill as a type and as a factor in rolling mill

economics are becoming recognized, and it is predicted that this type of mill will largely supplant the orthodox blooming mill.

The slabbing mill can reduce the width of an ingot while it is being reduced in thickness, thus making it feasible to produce, from a few standard sizes of ingots, slabs of any desired width and thickness within reasonable limits, thereby simplifying the work in the converting department and obviating the necessity for carrying a large assortment of various shapes and sizes of ingot molds. It can also, by substituting suitable horizontal rolls and retracting the vertical rolls to their extreme outer position, be used as an ordinary blooming mill for the production of blooms or billets. Furthermore, by using plain horizontal chilled rolls in conjunction with the vertical rolls, universal mill plates can be rolled; and, by retracting the vertical rolls, the mill can be used as a reversing plate mill. It can therefore be readily seen that this type of mill is a very useful one, and particularly so where the product of the finishing mills covers a wide range of sections for which suitable sizes of billets, blooms or slabs must be provided, or for mills doing a jobbing business.

The Lackawanna slabbing mill was built by Mackintosh, Hemphill & Co., Pittsburgh, Pa. It is of the two-high reversing type, and is designed to roll ingots up to 54 inches wide and 30 inches thick. The horizontal rolls are 32 inches in diameter, 64 inches long in the barrel, and have necks 25 inches in diameter by 25 inches long. The wabblers are 23 inches in diameter. Fig. 4 shows a side elevation, and Fig. 5 the plan of the mill, while Fig. 6 is an end elevation of the housing.

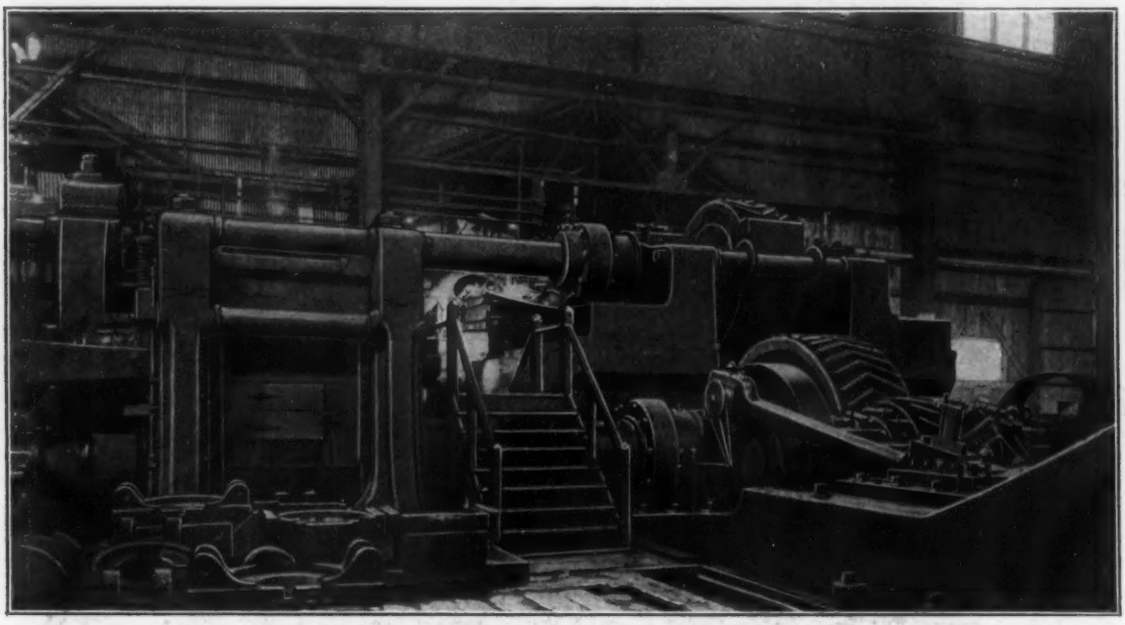


Fig. 3.—The Engine which Drives the Lackawanna Slabbing Mill.

The top roll is balanced by the hydraulic cylinders shown in section in Figs. 7 and 8, being suspended by rods attached to the roll carrier. These cylinders are also a part of an ingenious device for changing rolls quickly. The operation of this device, briefly, is as follows: The top roll is raised to its highest position by the cylinders and rods. These rods are provided with cotter ways, which, when the roll is at its highest position, just clear the top of the roll housings. Cotters are placed in the cotter ways and plungers are lowered until the cotters rest on the tops of the roll housings and support the roll. The plungers are now lowered just enough more to permit of adjusting the stirrups attached by chain slings to rods under the roll necks, as shown in Fig. 8. The roll is then raised, freeing the suspension rods which can then be lifted out of the way and the carrier removed, leaving the riders in the housings, if desired, there being a special provision for this purpose. The cantilever beam of the carriage, Fig. 8, can now be run under the roll, the roll lowered upon it and removed through the "window" of the housing. The plumbers can now be lowered and the stirrups placed under the lower roll necks, and after raising to the proper hight be taken out in the same manner as the top roll. By reversing the order of the operation new rolls can be placed in the mill. This arrangement provides an effective means for changing rolls with a minimum loss of time, and is patented by the builders of the mill. An end elevation is shown in Fig. 9, in which will be seen the location of the roll carriage.

The screw down apparatus for operating the horizontal rolls also possesses features that indicate the recogtion of the value of numerous small savings of time in mill operation. The screws are 11 inches in diameter and are operated by a 75 horse-power motor through the media of alternative trains of gearing of different ratios, either of which can be used at will by simply throwing a lever on the pulpit, which controls a hydraulic apparatus, which in turn operates a clutch mechanism. This arrangement permits of using a slow motion under the absolute control of the operator when screwing down and a very rapid motion when lifting the roll preparatory to receiving the next ingot. This is shown in the vertical cross section, Fig. 10.

One of the characteristic features of this mill lies in the treatment accorded to the problem of transmitting motion to the vertical rolls. A number of devices have been suggested and tried for this purpose, but for a reasonable immunity from costly breakdowns, simplicity and durability nothing has been found equal to bevel gearing when the design of the mill will admit of the use of gears well proportioned for the work entailed upon them.

In this mill, it will be observed, three vertical rolls are used, one working roll being driven positively by miter gears and the other working roll driven by means of frictional contact with a "dummy" roll, which is driven positively by the second pair of miter gears. The advantage of this arrangement becomes obvious when it is noted that it permits in this particular case, where 18 inches is specified as the minimum width of slab desired, the use of miter gears having a pitch diameter of 57.45 inches, a pitch of 7½ inches and a face of 20 inches. If but two vertical rolls are used, all other conditions remaining the same, gears having a pitch diameter of 36½ inches are the largest that can be used. And since the life of a gear depends on the strength and wearing surface of the teeth, it follows that the larger gear is the safer and the more economical.

With this arrangement of the vertical rolls no trouble whatever is experienced by reason of the rolls failing to

"bite" the ingot or slab. The positively driven roll forces the piece against the other working roll, forcing it in turn against its driver, causing the material to go through the rolls without slipping. This arrangement of the rolls and the method of driving are patented by the builders of this mill. If, however, a mill is desired to roll slabs narrower than 18 inches the vertical rolls may be somewhat larger in diameter, or the miter gears a little smaller, or both. The arrangement is shown in Fig. 11.

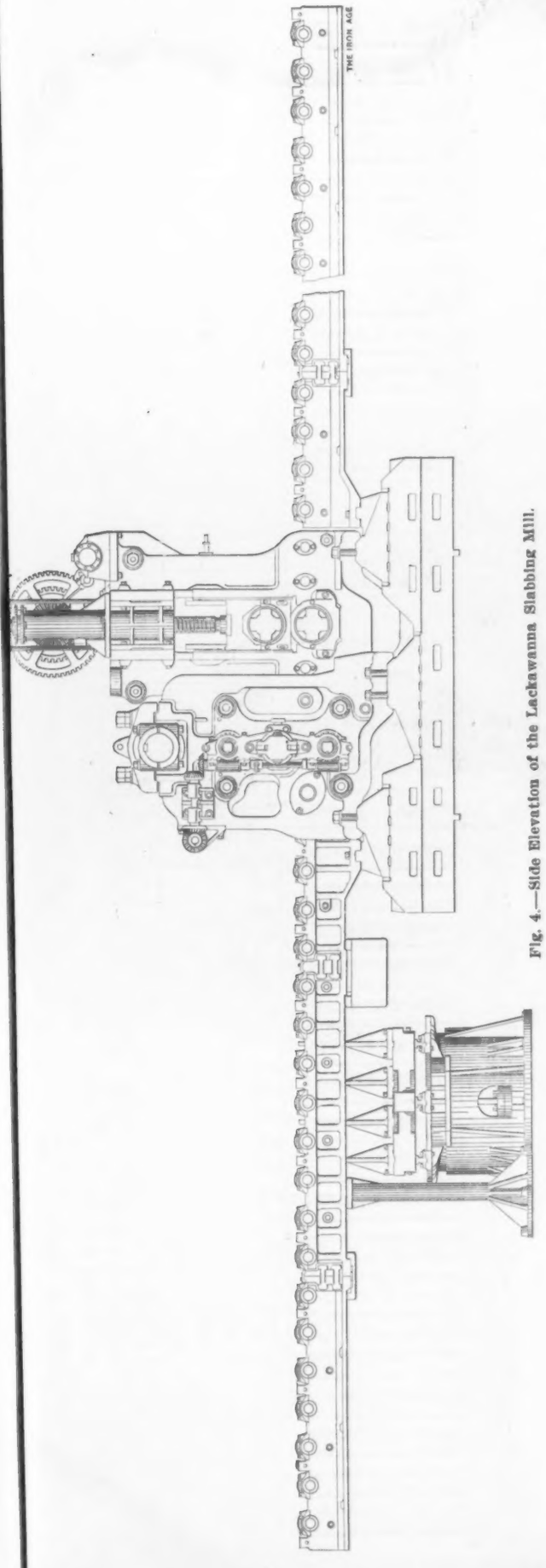


Fig. 4.—Side Elevation of the Lackawanna Slabbing Mill.

The vertical rolls in this mill are 22 inches in diameter and have necks 14 inches in diameter by 24 inches long. The horizontal rolls are driven by a double reversing engine having cylinders 46 x 60 inches, through gears of 9-inch pitch and 40-inch face, the pair having a ratio of about 1 to 2¼. The vertical rolls are driven by a separate double reversing engine, with cylinders 36 x 48 inches, through gears of 9-inch pitch and 30-inch face, and have a ratio of 1 to 1⅜.

The pinions are steel castings and contain 15 straight staggered teeth, triple shrouded. The pitch diameter is 44 inches, the pitch is 9.141 inches, and the face between shroudings 25½ inches, making a total face of 51 inches. The necks are 25 x 25 inches. The horizontal shaft, which transmits motion to the vertical rolls, is 20 inches in diameter, and the section resting in the housings weighs 24,640 pounds.

In this mill, it will be noted, the driving of the vertical rolls is accomplished by a single continuous shaft, substantially mounted in rigid bearings provided for it in the vertical roll housings, and the whole driving arrangement combines simplicity, durability and reliability.

The roller tables for serving the mill partake of the same substantial construction that characterizes the design of the mill. The rollers are all 18 inches in diameter. Those on the leading side of the mill are 8 feet 11 inches long, while those on the delivery side are 6 feet 7 inches long. The roller shafts are of forged steel, 8 inches in diameter in the body, and the bearings are 7½ inches in diameter by 15 inches long. The side shaft is 6 inches in diameter. The miter gears are 18.21-inch pitch diameter, 19 teeth, 3-inch pitch and 5-inch face, all steel castings. Each table is driven by its own reversing engine, with 14 x 14 inch cylinders, driving the 6-inch side shafts through gears of 3½-inch pitch and 12-inch face. The leading table is served by a manipulator of the Mackintosh-Hemphill type, shown in elevation in Fig. 4 and in section in Fig. 12.

## Germany's Latest Battle Ships.

The latest addition to the battle ships of the German navy is the Deutschland, which was launched from the Germania yard at Kiel on November 19. Her length between perpendiculars is 398 feet 6 inches; the maximum breadth, 72 feet 9 inches; and the draft, 25 feet 1 inch; the displacement being 13,000 tons. The armor belt is 9 inches thick amidships and 4 inches thick at the ends. There are two conning towers, the one at the fore being protected by 12-inch armor and the aft one by 5½-inch armor. The main armament consists of 4 11-inch guns mounted in a pair of turrets fore and aft, and protected by 11-inch armor. In the central casemate are 10 6.7-inch guns, and 4 more guns of the same caliber are contained in separate casemates. There are 22 3.5-inch quick-firers mounted on top of the casemates. The fighting tops contain 4 automatic machine guns of 1.5-inch bore, and 4 other machine guns of 0.3-inch. Six 18-inch submerged torpedo tubes are fitted—4 broadside, 1 at the bow and 1 at the stern of the vessel. The Deutschland is propelled by three sets of triple expansion engines, aggregating 16,000 indicated horse-power, and expected to give a speed of 18 knots. Steam is supplied by 6 cylindrical boilers and 8 water tube boilers, the latter of the Schulz-Thornycroft type.

**Mesta Mills for Chicago.**—The Mesta Machine Company, Pittsburgh, Pa., has just received important contracts for the Illinois Steel Company of South Chicago. These are the 31-inch blooming mill for the new structural plant, with accompanying tables and manipulators. The mill is to be two high, reversing, and will be used as the roughing mill for the structural mill. The Mesta Machine Company has also been awarded the contract for the three-high 28-inch structural train, with two roughing stands and one finishing mill.

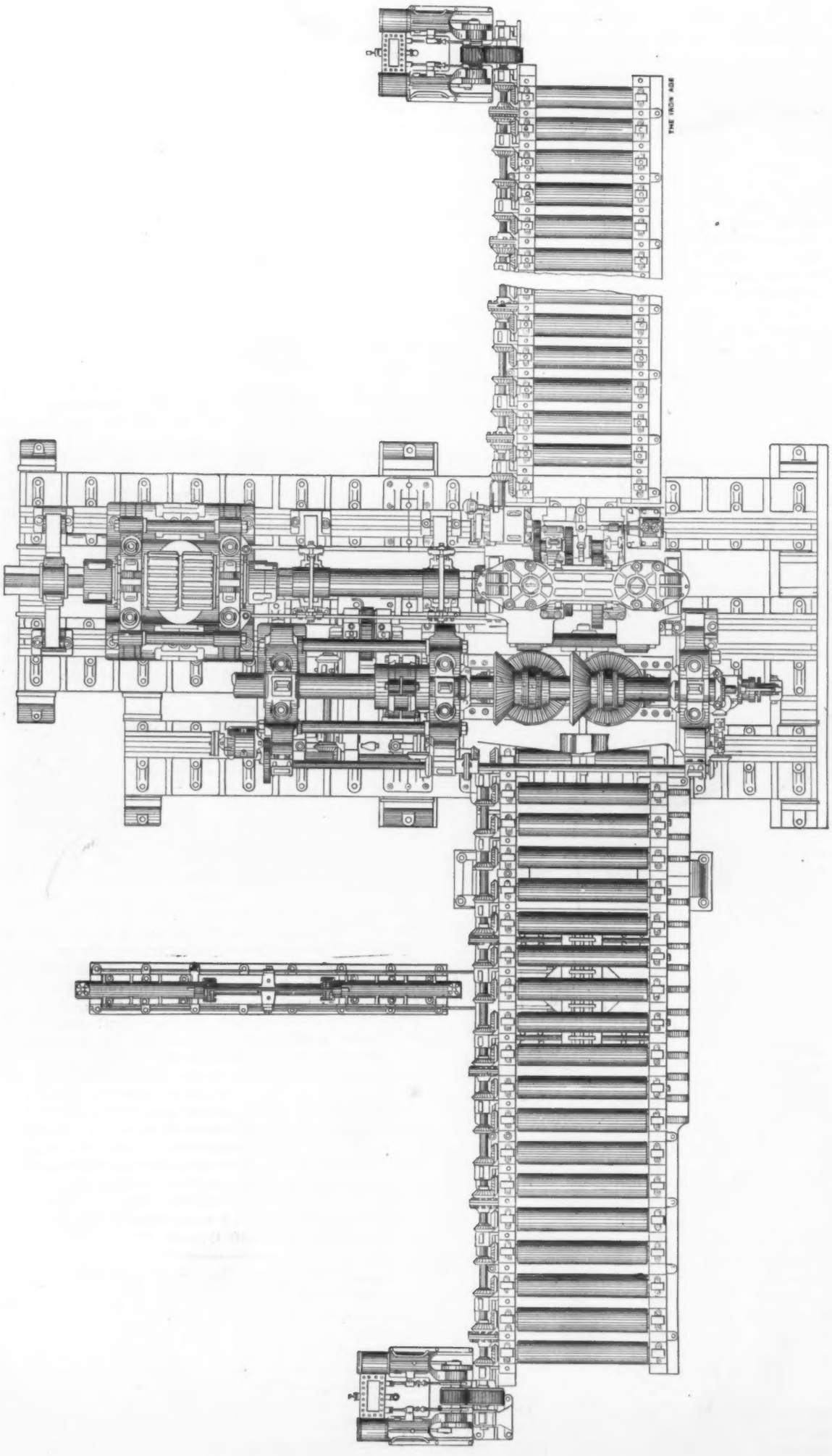


Fig. 5.—Plan of the Lackawanna Slabbing Mill.

# Pig Iron in the Central West During 1904.

BY J. G. BUTLER, JR., YOUNGSTOWN, OHIO, CHAIRMAN BESSEMER PIG IRON ASSOCIATION.

Pig iron is practically the foundation and basis of iron and steel in all its various and kindred forms; therefore no better barometer of the general business conditions prevailing throughout the United States can be named than the production of pig iron. The blast furnaces of the United States at the present time are just about able to produce enough pig iron for actual consumption. In the earlier part of the year and for a considerable portion of the year they could have produced more than enough for current needs. The following table applies only to the furnaces using Lake Superior ore, or tributary to the Lake Superior ore region, but it is a good general index to the conditions in the South, as well as portions of the North where Lake Superior ore is either not used at all or used in limited quantities:

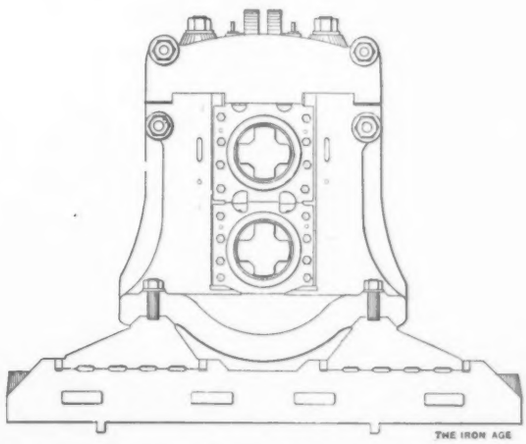



Fig. 6.—End Elevation of Housing of Lackawanna Slabbing Mill.

*Percentage of Active Capacity.*

| | Per cent. | | Per cent. |
|---|---|---|---|
| January 1, 1904 | 35.5 | July 1, 1904 | 65 |
| February 1 | 62 | August 1 | 59 |
| March 1 | 72 | September 1 | 72 |
| April 1 | 85.5 | October 1 | 74 |
| May 1 | 89.5 | November 1 | 75 |
| June 1 | 80 | December 1 | 78 |
| | | January 1, 1905 (est.) | 85 |

Had the furnaces run all through the year a very large surplus of pig iron would have been made, but the quantity produced has been wisely regulated, and chiefly by the co-operation of the very able management of the United States Steel Corporation. Had this corporation run its furnaces full the entire year the country would have been surfeited, but, co-operating with the Bessemer Pig Iron Association and other large producers, the production has been gauged very closely to the extent of the consumption. The production of the entire country at the present time is at the rate of 19,000,000 gross tons per annum. On January 1, 1904, it was considerably less than half this amount. The improved conditions began in the early part of January, and were first noted by a spirited and persistent demand for nearly all kinds of scrap, the price advancing very sharply. This improved condition continued in February and later culminated in June and July, when the demand again fell off and many furnaces were blown out for the want of a market. Shortly following the election of President Roosevelt conditions again began to improve, and very rapidly, and it looked for a time as if a runaway market was in sight. There is still some idle capacity, but very little. As is known, it is not possible to have 100 per cent. of the furnaces in blast. Furnaces must be blown out for repairs, others are idle making improvements. Financial reasons may prevent a furnace being in blast, or lack of a proper ore mixture may debar a furnace from operation. I believe the usual percentage of idle furnaces for repairs, improvements, &c., would be about 10 per cent. The new furnaces built during the year were largely erected in connection with steel plants. Very few independent stacks were built, or, in other words, the consuming capacity for pig iron has increased more rapidly than the capacity for pig iron production.

The increased production of basic and Bessemer pig iron in the Mahoning and Shenango Valleys and other points north has been quite marked. Practically 100 per cent. of the furnaces in operation during the latter part of 1904 were somewhat handicapped by an insufficient coke supply. The increased and increasing use of basic pig iron, owing to the rapid development of open hearth steel practice, is very marked, and the quality used throughout the entire country is fast overtaking the Bessemer product. Heretofore it has been considered that basic iron should sell from 25 cents to $1 per ton below standard Bessemer, but the prices of standard Northern basic and standard Bessemer are gradually getting together; and there is no reason why this should not be so, as the cost is practically the same and the finished products made from basic metal bring higher

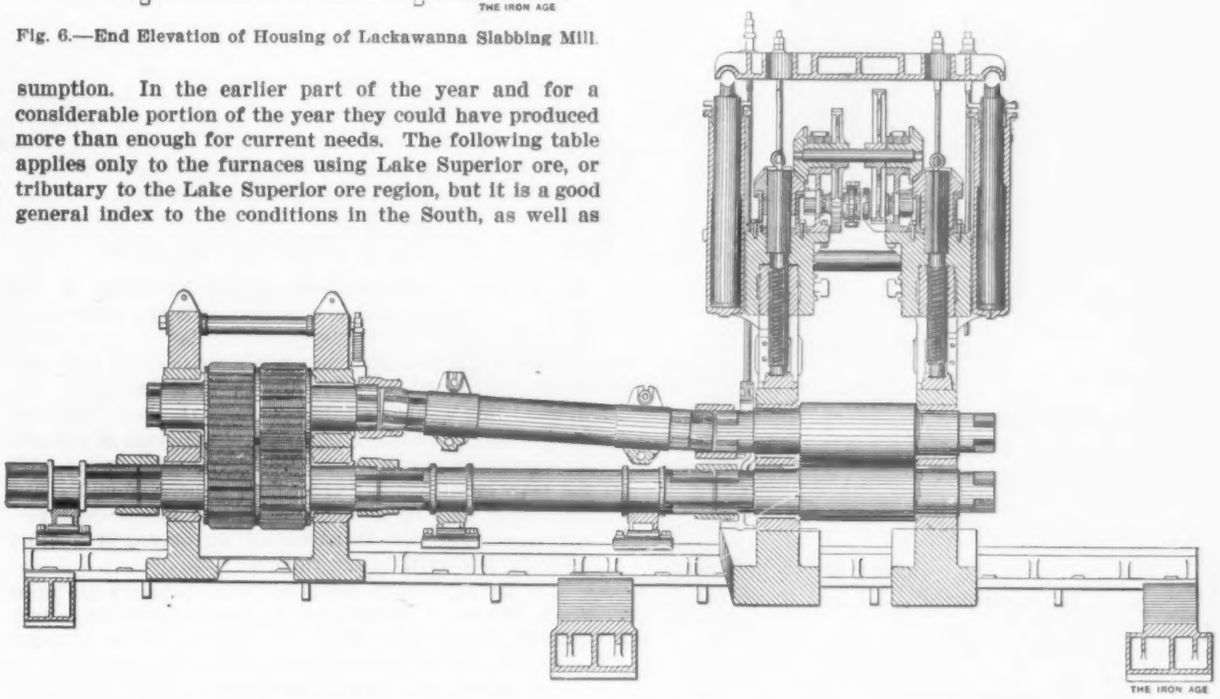



Fig. 7.—Section through the Top Roll Hydraulic Cylinders of the Lackawanna Slabbing Mill.

THE LACKAWANNA SLABBING MILL.

prices than similar products made from Bessemer iron as a basis.

The independent furnaces of the country have been able to market such pig iron as they have produced without the assistance of the large steel producers during the past year. It is true that a purchase of 25,000 tons was made for quick delivery in December, but this was rather in the nature of an emergency purchase and was not considered as having any particular effect on the market. It is the avowed intention of the large steel producers to make all their own pig iron, and it is perhaps equally the avowed desire of the independent producers and consumers of pig iron to travel their own road.

There has been much talk in the past few years of the building of a steel plant in the valleys which would take care of the product, and more or less figuring and work have been done with reference to this project in the way of securing the location and providing for capital,

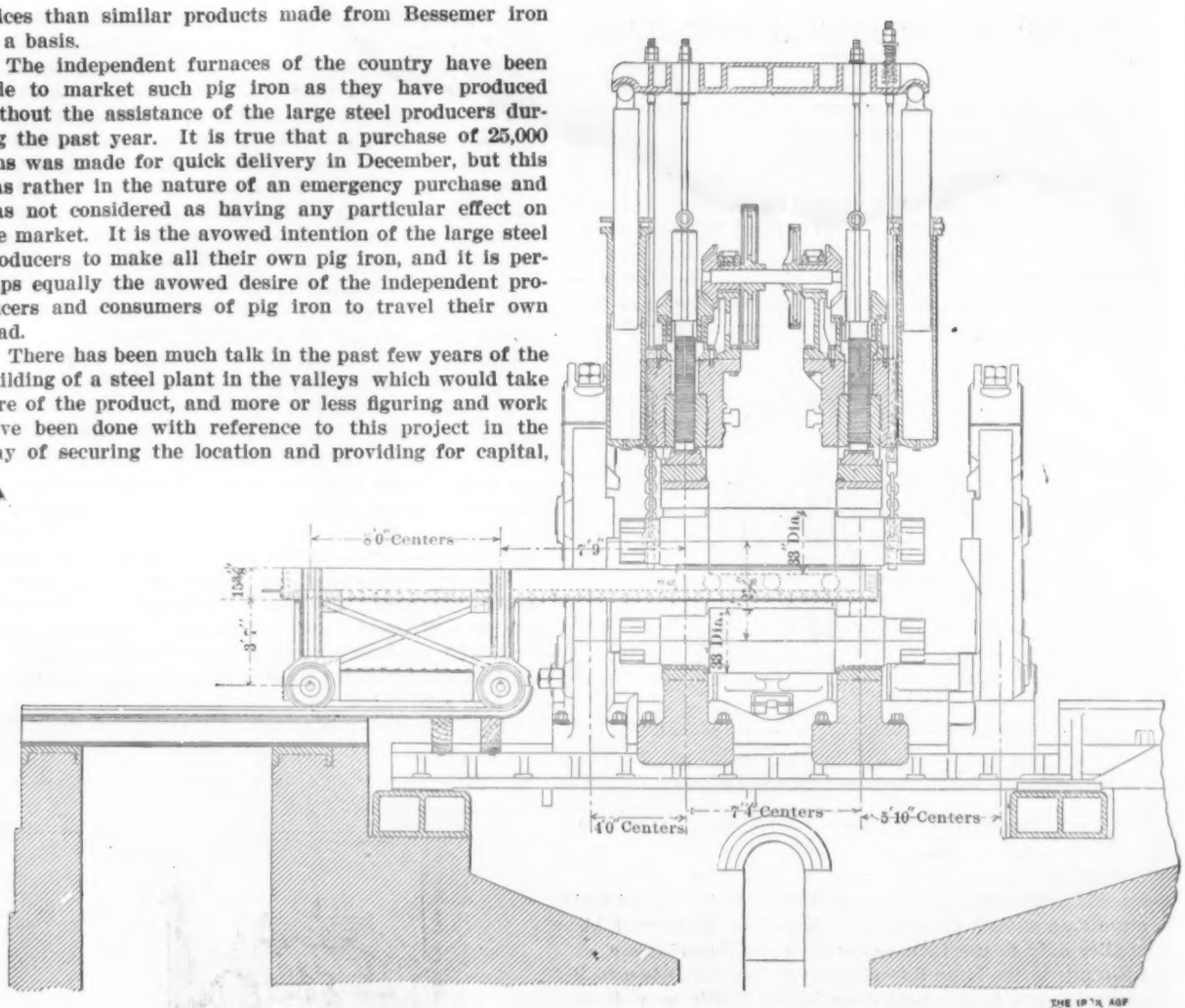



Fig. 8.—Section Showing Roll Changing Device of the Lackawanna Slabbing Mill.

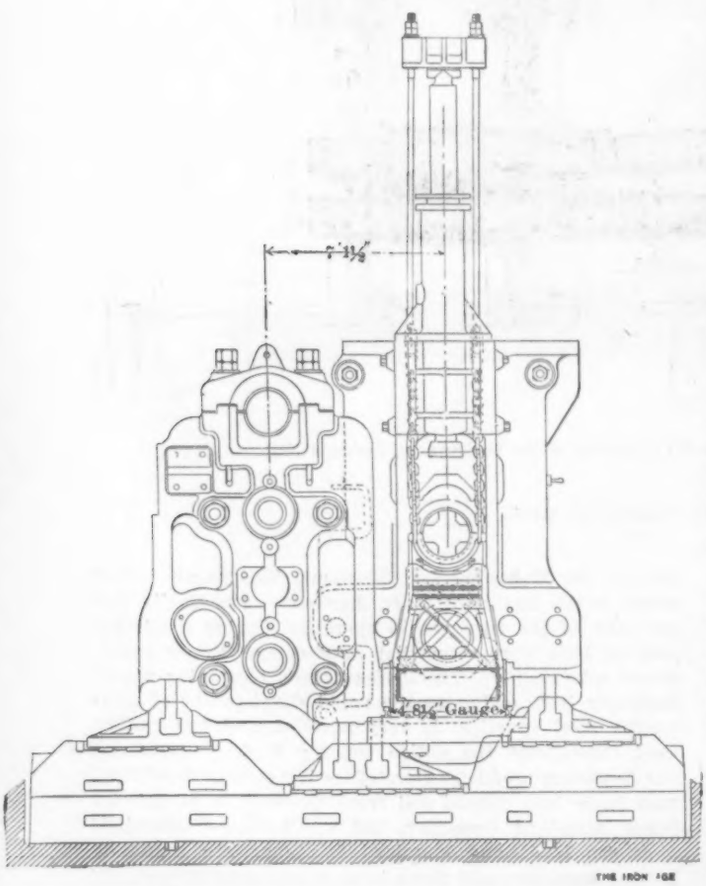



Fig. 9.—End Elevation of the Lackawanna Slabbing Mill.

THE LACKAWANNA SLABBING MILL.

but up to the present time nothing has come of this matter. It is still, however, in the minds of a great many interested people that this should be done. It is probably only a question of time when a step of this kind will be demanded and carried through to a successful conclusion; this would probably mean in the end additional independent blast furnaces. The consumption of pig iron for malleable purposes and steel castings, coupled with the very great amount needed for general foundry use, practically uses up the surplus of the independent producers, so that new furnaces will be needed if another steel plant is built in the valleys.

The use of Mesaba ore in the blast furnaces has practically increased, notwithstanding the inconvenience arising from the escaping dust. Many furnaces use as much as 85 per cent. of Mesaba ore, and it is believed that the coarser grades produced in the Mesaba district will gradually approach and reach the price of the Old Range soft ores of otherwise similar quality. The 1904 production of Lake Superior ore approximated 22,000,000 tons. Sixty per cent. of this output was Mesaba ore—a gain of 20 per cent. over 1903 in the Mesaba range contribution.

The following table shows the average price of standard Bessemer pig iron, by months, during the year 1904, delivered at Pittsburgh:

| | | | |
|---|---|---|---|
| January | $13.91 | July | $12.55 |
| February | 13.66 | August | 12.80 |
| March | 14.15 | September | 12.60 |
| April | 14.19 | October | 13.16 |
| May | 13.60 | November | 14.85 |
| June | 12.91 | December | 16.50 |

The following table gives the production of pig iron in the United States during the past decade, and shows the wonderful growth of this industry:

| | Gross tons. | | Gross tons. |
|---|---|---|---|
| 1894 | 6,657,388 | 1900 | 13,789,242 |
| 1895 | 9,446,308 | 1901 | 15,878,354 |
| 1896 | 8,623,127 | 1902 | 17,821,307 |
| 1897 | 9,652,680 | 1903 | 18,009,252 |
| 1898 | 11,773,934 | 1904 (est.) | 16,000,000 |
| 1899 | 13,620,703 | | |

The indications are very favorable for a substantial and healthy business during the year 1905, and it is the belief in well informed circles that all the pig iron that can be produced will be needed for actual consumption. There is no sectionalism in pig iron. The growth of this industry in the South since the Civil War is marvelous. The product is brought North in large quantities, and its mixture with Northern iron in various and beneficial ways is typical of the cementing and welding of a once divided, but now united, people.

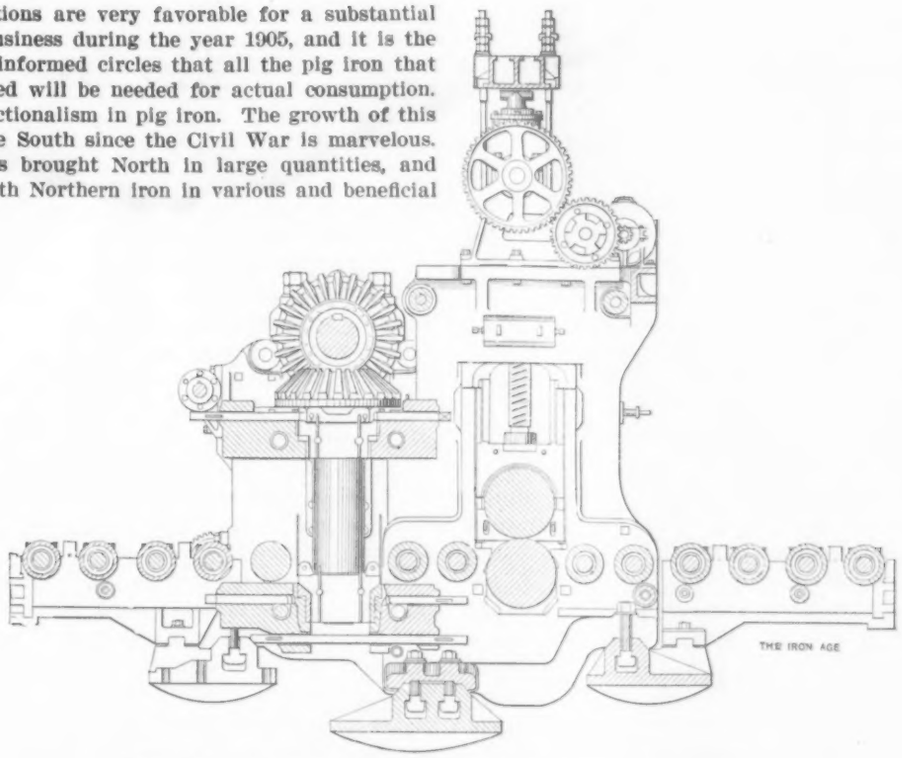



Fig. 10.—Vertical Cross Section of the Lackawanna Slabbing Mill.

**Sault Ste. Marie Canal Tonnage in 1904.**—During the season of navigation just closed 109,605 net tons of copper, valued at $80,689,400, passed through the Sault Ste. Marie Canal from Lake Superior to ports on the lower lakes. The iron ore shipments amounted to 19,655,597 net tons and the wheat and other grains to 49,928,869 bushels. In addition to the whole grain shipments there were 4,710,188 barrels of flour. Lumber, 1000-feet board measure, amounted to 923,380. General merchandise reached 95,474 net tons, with 1356 net tons of silver ore. The decrease in total tonnage for the year amounted to only 3,129,331. Many of the staple items of shipment showed considerable increase, chiefly pig iron, which increased 19 per cent. over 1903. The total tonnage passing through the canal was: Eastbound, 24,213,962, and westbound, 7,332,204. This enormous traffic was carried in 16,120 vessels of all kinds.

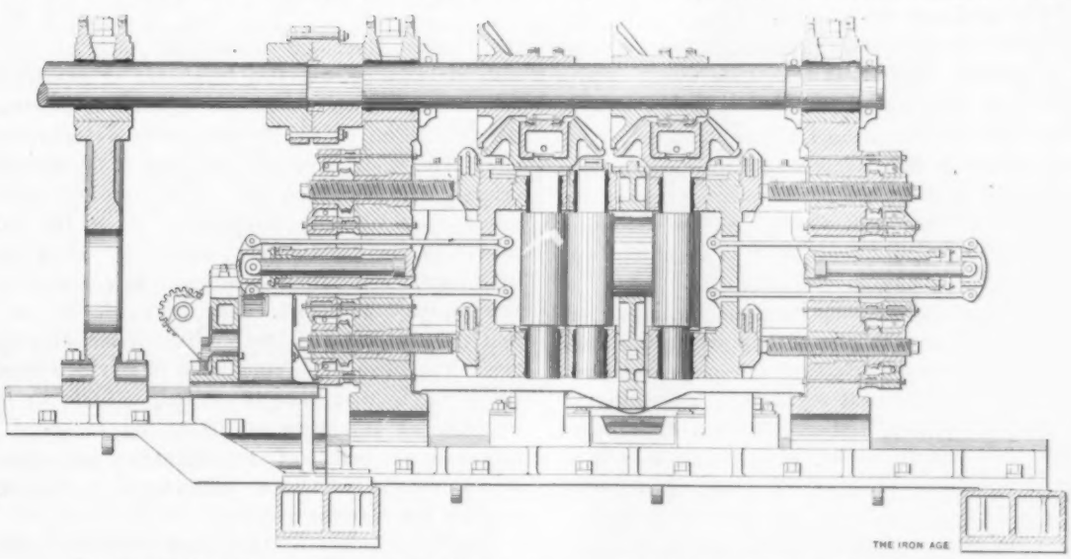



Fig. 11.—Section through Vertical Rolls of the Lackawanna Slabbing Mill, Showing Method of Driving.

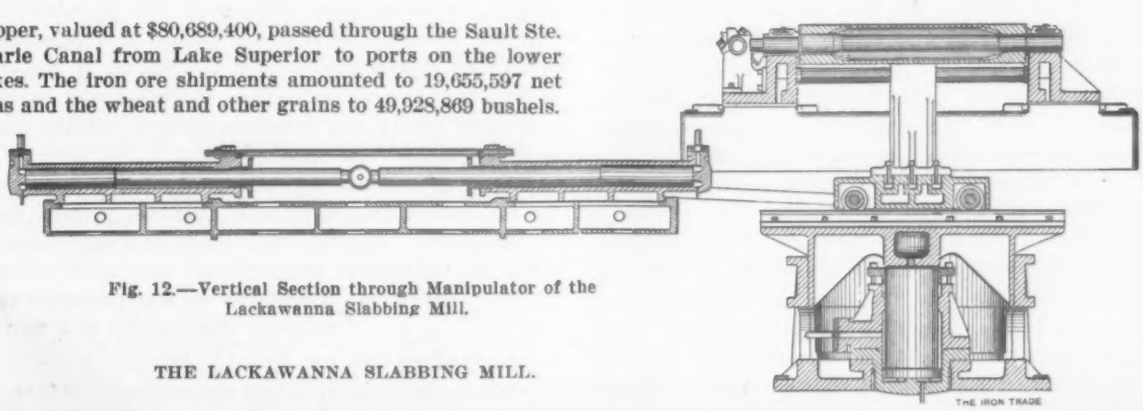



Fig. 12.—Vertical Section through Manipulator of the Lackawanna Slabbing Mill.

THE LACKAWANNA SLABBING MILL.

# The Philadelphia Iron Trade in 1904.

BY THOMAS HOBSON, PHILADELPHIA.

One year ago we began our annual review by saying that the condition of the iron trade could not be defined with much exactness. The same expression might be used on this occasion, while at the same time it suggests that the iron trade is becoming a more complex problem every year and that any one who undertakes to say what it will be six months or a year hence is liable to find himself in error.

The writer may claim to have had some experience, the present being the twenty-ninth consecutive yearly review written by him for *The Iron Age*, yet the difficulty in arriving at a clearly distinct opinion is greater than ever. Thirty years ago the Lehigh, Schuylkill and Lebanon valleys comprised most of the iron trade in the United States (barring the Pittsburgh district), while at the present time there are at least three or four separate districts of commanding importance, besides others which have considerable trade in what is comparatively local territory. Then again the pig iron production has increased from 2,024,000 gross tons in 1875 to a pretty well assured output of over 20,000,000 tons during 1905, so that with practically ten times the production, and a field covering a vastly larger territory, it will be readily seen that the problem of prices and other controlling factors is becoming more complicated every year.

The question of trusts was also referred to a year ago, but the developments since then have not been important, and so far as they are concerned there is practically no change. The claim that they would control prices has not been substantiated, except as regards steel rails. Their influence in all lines, however, is undoubtedly of great importance, and on the whole is not regarded as unfavorable. Still, there is less apprehension of danger from that source, and the growth of independent plants shows that there is room for well equipped and well managed concerns.

In regard to the general management of business, there are many gratifying evidences of improvement. There is a disposition among manufacturers to co-operate whenever it can be done without sacrifice of individual interests, and that seldom happens—if ever. The object is not coercive, but protective, and it has worked so well that it will undoubtedly be continued. Thus, when it was clear that too much pig iron was being made, a *pro rata* restriction was agreed upon, and it was surprising how quickly it checked the weakness and the irregularity in prices. Pig iron makers conduct their business with due regard to supply and demand as well as to secure a reasonable return on the capital invested. There is also more of a determination to make contracts that are to be lived up to and not to be regarded merely as buyer's options. These are hopeful features and will do much to eliminate the risks and uncertainties which were formerly regarded as unavoidable. This is one of the most interesting signs of the times, and encourages the belief that such periods of depression as were experienced during 1893 to 1897 are not likely to occur again. Last year at this time no such statement could have been made with any degree of confidence, and, as a matter of fact, it looked as though such a contingency was highly probable. Good management on the part of iron and steel manufacturers, however, tided over the most critical period by an immediate curtailment of production, so that there was no time when forced sales had to be made.

Another feature is that the decline in prices has been less than was generally expected. The lowest figure for the year was about $14, Philadelphia, for No. 2 X foundry. No great tonnage was sold below $14.25 to $14.50, but many of the most experienced men in the trade were inclined to look for $12.50 to $13 for No. 2 foundry iron, with a tonnage for the year not exceeding 12,000,000 to 14,000,000 tons. It is now seen that prices have averaged much better than was anticipated and that the tonnage was far and away beyond the most liberal estimate. Evidently, therefore, estimates even by the most experienced people are liable to be very wide of the mark, so that little can be said in regard to the coming year except that it promises to be one of great prosperity. Wall Street is usually regarded with suspicion as a trade barometer, but it is only fair to say that the buoyancy of the stock market has been a great help to the iron and steel trades during the past three or four months. The old theory was that iron was the leader, but in this case Wall Street has done much to help the iron trade, although it may not be safe to follow it too closely or too long.

The outlook indicates a consumption of not less than 20,000,000 tons of pig iron during 1905, and it may run 5 or 10 per cent. more than that. It cannot be said that there are no clouds on the horizon; there are none that look threatening, but this is an era of great possibilities. The financial situation appears to be easy, and the production of wealth was never as great as it is now. The wheat crop was poor, but it is offset by high prices. The corn and oat crops were enormous and prices are extremely satisfactory, while the hay and root crops also yield heavily, and as for cotton, we have it to burn. The output of minerals is a source of great and increasing wealth, and there can be no doubt that the *per capita* is greater than it has ever been before. The increase in population is nowhere equaled in the world, so that there is not only a basis for increasing demand but there is the ability to spend. This applies to the transportation companies and other great corporations as well as to individuals, so that there is warrant for extreme optimism.

The termination of the great conflict in the East is not likely to be delayed very much longer and this should give an enormous stimulus to our manufacturing interests. There is of course a chance of disagreement among the neutral powers and a widening of the area of war, but the probabilities are the other way, so that it is fairly certain that American interests will not suffer by developments from outside sources.

The great demand, however, is expected to come from the railroads, although there is abundant promise from the shipyards, pipe lines, &c., since all departments of trade are believed to be on the eve of a great revival. The fact that the reaction during the last quarter of 1903 and the halting at different periods during 1904 had so much less effect than was feared is regarded as good evidence that the basic conditions were better than was believed, and strengthens the impression that there is a tendency to underrate, rather than overrate, the intrinsic merits of the situation.

At the moment, however, everything points to "a big year" during 1905. What it will be in regard to prices is rather indefinite, but the general idea is that after the turn of the year, when things begin to move, the tendency will be toward improvement.

There is little to be said in regard to foreign trade. A considerable tonnage of steel has been exported, mostly sheet bars, wire products, tubes and steel rails, but the prices realized were much below those quoted to the American trade and could not leave much margin for profit. The million or more tons of steel that was exported during 1904 will probably not be repeated during 1905, as the home market promises to be large enough without any export business. If prices advance much further imports may begin to come this way soon. One if not two cargoes of pig iron are reported to be manifested for the United States during January, but these are for drawback trade and at present prices there is not much danger from that source. At a dollar or two higher imports would not be improbable, but conditions are so much better than they were during most of 1904 that it is hardly likely that we shall have any important tonnage to spare for the export trade.

### Pig Iron.

The course of the market for pig iron has been of a somewhat erratic character, although until five or six weeks ago the changes were extremely light. The opening price in January was about $14.75 for No. 2 X Foundry, and from $15 to $14.25 was practically the range to September inclusive. In October the demand began to increase and prices stiffened to $15. During November there was an advance to $16, and in December to $17.50, at which the year closes on a strong market. One reason for the steadiness in prices was the unanimity of action among producers. When the market looked full the output was cut down, and kept down until the demand began to increase. That about tells the whole story. The rapid advance during the last month of the year was due in some measure to a conviction that prices were going higher. The election was so eminently satisfactory that the entire country jumped to the conclusion that 1905 would be a great year for business and consumers of pig iron began to prepare for it, taking large quantities of iron at prices which represent an advance of $2.50 per ton during the last two months of the year. It is a little singular that prices varied less than $1 per ton during the first ten months, $15 being the high limit and $14.25 the low, so that a full $2.50 advance belongs to November and December, mainly the latter. What prices are going to rule during the next three or four months is an extremely interesting problem.

Ordinarily there should be a little reaction during January, and if experience is a safe guide there will be one, but as we said at the beginning of this article conditions are so changed that experience no longer applies with absolute certainty. Nevertheless, the influences that caused the advance have been somewhat negatived during the past few days. The drought in the coke regions has been broken, and as the furnaces are so largely sold ahead, the immediate needs of consumers cannot be very great. A somewhat inactive demand during the next few weeks would not therefore be at all surprising, but neither would it change the general outlook, although it might check the tendency to higher prices, which would not be a bad thing to do, until there is distinct evidence that the market can stand a further rise.

A somewhat higher level of prices than during 1904 is quite probable, as 20,000,000 tons or more of pig iron will be required for consumption, and a tonnage of that volume involves higher prices than one of 14,000,000 or 15,000,000. Nevertheless, the trade deprecates high prices, although no way has yet been found by which they can be prevented when the buying once gets a good start. An effective measure might be to have a distinct understanding that every ton of iron bought during a period of high prices would have to be taken on specified dates. This would tend to conservative methods and possibly prevent many of the annoyances which invariably accompany a declining market.

As an indication of the wonderful change within a year, it may be noted that the output of pig iron during November, 1903, was only 1,039,622 gross tons, and in December 846,605 tons, and at that the market was extremely weak. During November of this year production was 1,480,602 tons, and December will probably not be less than 1,500,000 tons, but as official figures are not available, this is merely an estimate, though not likely to be far astray. The two months on this basis would figure out 1,886,227 tons for 1903 and 2,980,602 tons for 1904. This disparity will not be as great during the coming year, but it shows the immense change which has taken place since last year.

Prices, as will be seen herewith, have been very uniform during most of the year, the advances all being made during the last quarter, the following being the ruling quotations per gross ton in the Philadelphia market on the first of each month:

| Months. | No. 2 X foundry. Per ton. | No. 2 plain. Per ton. | Standard gray forge. Per ton. | Basic. Per ton. |
|---|---|---|---|---|
| January 1, 1904..... | $14.75 | $14.25 | $13.50 | $14.00 |
| February 1..... | 14.50 | 14.00 | 13.50 | 13.75 |
| March 1..... | 14.50 | 14.00 | 12.75 | 13.75 |
| April 1..... | 15.00 | 14.50 | 13.75 | 14.00 |
| May 1..... | 15.00 | 14.50 | 13.75 | 14.00 |
| June 1..... | 14.50 | 14.00 | 13.50 | 13.75 |
| July 1..... | 14.50 | 13.75 | 13.25 | 13.15 |
| August 1..... | 14.25 | 13.50 | 12.50 | 13.00 |
| September 1..... | 14.25 | 13.50 | 13.00 | 12.75 |
| October 1..... | 14.25 | 13.50 | 12.75 | 12.75 |
| November 1..... | 15.00 | 14.50 | 14.00 | 13.75 |
| December 1..... | 16.50 | 16.00 | 15.50 | 15.50 |

### Steel Billets.

The year 1904 has been somewhat tame from a business point of view, the extreme range of prices not being more than $4 per ton. The opening prices in January were about $24.50, at which they remained until March, when prices were half a dollar higher. In April the highest figures of the year were reached, some sales having been made at $26, but the advance did not hold, and during May prices were again $24.50 and from that time to September they ranged from $23.50 to $24. During the latter month new prices were announced, after which there was a decline to $22, but in November there was a recovery to $23 and in December to $25, with a probability that January prices will be still higher. Prices for basic iron are $2.50 higher than they were a year ago, while billets are practically no dearer than they were when pig iron and scrap could be had at from $2.50 to $5 per ton less money. This is a disparity that will in some degree have to be corrected, presumably by higher prices for steel, although that may not come immediately.

### Plates.

The plate trade has not been satisfactory during the past year. The volume of business was greatly reduced, and for most of the year half to two-thirds time would be a full average of work for mills in this vicinity. Orders accumulated very rapidly, however, during the past few weeks and if specifications are sent in as expected the mills can start up to their full capacity, or pretty near to it. The prospect for business during 1905 is of the most hopeful character, and large as the capacity is it will probably be utilized to its fullest extent. Prices are not proportioned as they ought to be, and while unanimity of action has been beneficial in other lines of business, there appears to have been a surprising want of good judgment in the plate and structural associations. The reduction of $4 per ton, for instance, on plates and structural material in September proves to have been a bad mistake. It certainly brought a good deal of business, but it simply threw $4 per ton away without any equivalent whatever. It brought no tonnage other than what would have come in anyway, and while the mills are working on plates at reduced prices they are paying dollars per ton more for the raw material, and even at the recent $2 advance they are still relatively greatly out of proportion with the rest of the market, as, for instance, $14 per ton a year ago for pig iron and $11.50 for steel scrap, against 1.72½ cents for plates, while present

prices are $16.50 for pig iron, $16.75 for scrap and 1.63½ cents for plates. Two dollars and a half more for pig iron, $5 more for scrap and $2 less for finished products! A pool that cannot do better than that appears to need reorganization.

**Structural Material.**

What has been said in regard to the plate trade applies in large measure to the structural trade. Probably the mills have averaged better as regards employment, but prices have worked in unison with plates, reductions and the later advance being made at the same time. The only feature as regards next year's business is that the Lackawanna Company will be in a position to make a large output, as well as the Eastern Steel Company at Pottsville, which expects to contribute over 100,000 tons to the output during 1905. But a big business seems to be assured, probably enough to employ the entire capacity of all the mills in the country.

**Bars.**

Bar iron manufacturers appear to have had a very mixed sort of business during the past year. At times they may have made a little money, but more frequently they had very little business that returned more than a new dollar for an old one. Prospects are certainly much better than they were a year ago, or in fact at any time during the year until very recently, and with everything in demand the bar trade will surely get its share. The high price of raw material is the most difficult problem, and next to that is to adjust prices in proportion with steel bars. Prices have not varied a great deal at any time during the year. They began very low, in some cases as low as 1.25 cents, although 1.30 was regarded as a minimum for good quality bars. Prices hardened to 1.40 during February, and during March reached 1.50 cents, which was held pretty well up to midsummer, when weakness again set in and some cutting was reported, although nominally prices were unchanged. In September, however, the market became very weak and 1.43½ cents was a common figure, but it was only here and there that less than that was accepted. During November the market hardened to 1.50 cents, and since then slight advances have been made until 1.63½ cents is about as well as can be done to-day, some mills quoting a still higher figure. Prospects for 1905 are very good and indicate conditions about the reverse of what we said in our last yearly review.

**Old Material.**

This branch of the trade is becoming more complex year by year. Its importance can scarcely be overestimated, while its movements are extremely hard to follow. Advances and declines (especially the former) are so sudden and so vigorous that they hardly allow time for consideration, but for a buyer (and sometimes a seller) to hesitate is to be lost. Nothing on the entire list shows more erratic movements than the prices for scrap material, varying as they have from $5 to $8 per ton from lowest to highest on some of the specialties. The competition among dealers is so great that they almost invariably have to pay full market prices at the time of purchase and take their chances of getting out at a profit. Besides the usual competition railroads and others make swaps for finished products, arranging prices so that fictitious rates are sometimes made, said to be mainly for the purpose of skinning the middle man; but he lives and prospers and will continue to do so in spite of all that may be done to cut him out.

The following quotations show the Philadelphia range of prices per gross ton for the year, month by month.

| | Jan. 1. | Feb. 1. | Mar. 1. | April 1. |
|---|---|---|---|---|
| Old steel rails | $11.50 | $12.75 | $14.00 | $15.00 |
| Heavy steel scrap | 11.00 | 12.50 | 13.75 | 16.00 |
| Low phosphorus scrap, nominal. | 15.00 | 16.00 | 18.00 | 18.00 |
| Old steel axles | 14.00 | 16.00 | 16.00 | 18.00 |
| Old iron rails | 16.00 | 15.50 | 15.00 | 18.50 |
| Old iron axles | 15.50 | 18.00 | 19.00 | 22.00 |
| Old car wheels | 12.75 | 13.00 | 13.00 | 13.50 |
| Choice scrap, R. R. No. 1 wr'ght. | 15.00 | 15.50 | 16.00 | 18.00 |
| Country scrap | 12.00 | 13.50 | 14.50 | 16.50 |
| Machinery scrap | 12.75 | 12.75 | 13.25 | 13.50 |
| No. 2 light scrap | 11.00 | 11.00 | 11.50 | 12.50 |
| No. 2 light (ordinary) | 9.00 | 9.00 | 10.00 | 10.50 |
| Wrought turnings | 8.50 | 9.00 | 9.25 | 10.00 |
| Wrought turnings, choice heavy. | 10.00 | 10.00 | 10.00 | 10.50 |
| Cast borings | 6.25 | 7.00 | 7.25 | 7.75 |
| Stove plate | 10.00 | 11.00 | 11.50 | 12.50 |
| Wrought iron pipe | 10.50 | 11.50 | 12.00 | 13.00 |

| | May 1. | June 1. | July 1. | Aug. 1. |
|---|---|---|---|---|
| Old steel rails | $13.00 | $12.00 | $11.00 | $11.50 |
| No. 1 steel scrap | 13.00 | 12.00 | 11.00 | 11.50 |
| Low phosphorus scrap, nominal. | 17.50 | 16.00 | 15.00 | 16.00 |
| Old steel axles | 16.00 | 15.00 | 15.00 | 14.50 |
| Old iron rails | 17.25 | 15.00 | 14.50 | 13.75 |
| Old iron axles | 20.00 | 17.00 | .... | 17.50 |
| Old car wheels | 12.00 | 12.00 | 11.00 | 10.50 |
| Choice scrap, R. R. No. 1 wr'ght. | 17.00 | 13.50 | 12.50 | 13.00 |
| Machinery scrap | 12.50 | 12.50 | 11.00 | 11.50 |
| No. 1 forge fire scrap | 12.50 | 10.50 | 9.50 | 9.00 |
| No. 2 forge fire scrap (ordinary) | 10.00 | 9.00 | 8.00 | 7.50 |
| Wrought turnings | 10.00 | 8.50 | 8.00 | .... |
| Axle turnings, choice heavy | 11.00 | 10.00 | 9.00 | .... |
| Cast borings | 7.00 | 6.50 | 6.25 | .... |
| Stove plate | 11.00 | 9.00 | 9.00 | .... |
| Wrought iron pipe | 12.00 | 10.00 | 9.50 | 9.50 |

| | Sept. 1. | Oct. 1. | Nov. 1. | Dec. 1. | Dec. 31. |
|---|---|---|---|---|---|
| Old steel rails | $12.00 | $12.25 | $14.00 | $16.00 | $17.00 |
| No. 1 steel scrap | 12.00 | 12.25 | 14.00 | 16.00 | 16.25 |
| Old steel axles | 15.00 | 15.50 | 17.00 | 19.00 | 18.50 |
| Old iron axles | 18.00 | 18.50 | 19.75 | 22.00 | 23.50 |
| Old iron rails | 15.50 | 15.50 | 17.00 | 18.50 | 20.00 |
| Old car wheels | 12.00 | 12.00 | 13.50 | 14.00 | .... |
| Choice scrap, R. R. No. 1 wr't | 14.25 | 15.00 | 16.00 | 18.50 | 19.50 |
| Machinery scrap | 11.50 | 12.00 | 13.00 | 14.50 | 15.00 |
| Low phosphorus scrap | 16.00 | 16.50 | 17.50 | 18.00 | 20.50 |
| Wrought iron pipe | 10.50 | 11.25 | 12.25 | 14.50 | 15.00 |
| No. 1 forge fire scrap | 10.00 | 10.00 | 11.00 | 14.00 | 14.00 |
| No. 2 forge fire scrap, ordi'ry | 8.00 | 8.00 | 9.50 | 11.00 | 11.00 |
| Wrought turnings | 8.75 | 9.00 | 9.00 | 12.00 | 12.75 |
| Wrought turnings, ch'ce h'vy | 10.00 | 10.00 | 10.00 | 12.75 | 13.75 |
| Cast borings | 6.75 | 6.95 | 7.25 | 9.50 | 10.00 |
| Stove plate | 9.00 | 9.50 | 10.50 | 13.00 | 13.50 |

## The Zinc Plant at Depue, Ill.

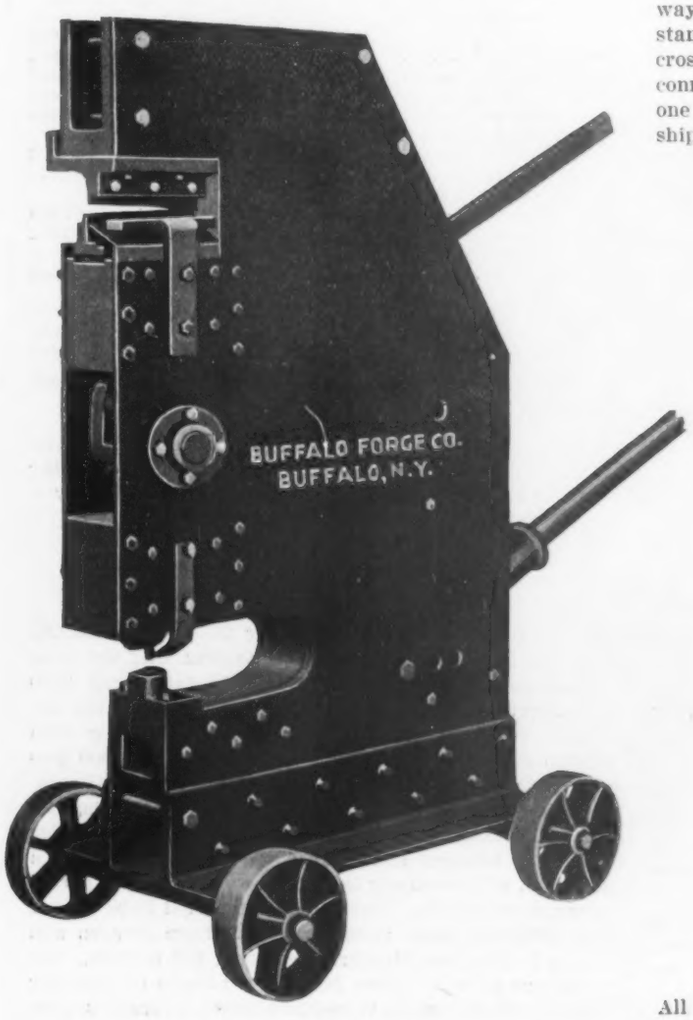
A large zinc works is being built at Depue, Ill., by a company that has thus far been given no corporate name. The company, however, is practically the Mineral Point Zinc Company of Mineral Point, Wis., and Chicago and the New Jersey Zinc Company of New York. It has secured 400 acres of ground in a tract that is reached by the Indiana, Illinois & Iowa, the Chicago, Milwaukee & St. Paul and the Chicago, Rock Island & Pacific, and has begun the erection of a plant for the purpose of smelting zinc ores. The immediate construction will embrace only a plant with about 35 tons daily capacity, while it is the plan of the company ultimately to enlarge this to a plant five or six times as great and to add mills for rolling sheet zinc. The plant will comprise a number of buildings, the largest of which will of course be the building devoted to the reduction or ore. Depue is only six miles from Peru and La Salle and was selected by the company for the same reason that prompted the location there of Matthiessen & Hegeler and the Illinois Zinc Company, chief of which is the abundance of good coal in the immediate neighborhood. Ores for this plant will be brought both from the Mineral Point region and from Missouri and Colorado. Wells Brothers, Chicago, have the contract for erecting the first building—namely, the pottery building, a 3-story brick and steel structure—in which will be made the earthen ware retorts necessary for the reduction of the ore. The office of the company is the same as that of the Mineral Point Zinc Company, in the Marquette Building, Chicago. David B. Jones of the Mineral Point Company is president of the new company and Thomas D. Jones is secretary. Wm. E. Moore, Peru, Ill., is superintendent of construction and Geo. C. Stone of New York is chief engineer. It is the purpose of the company to push the construction work as rapidly as possible with a view to having the initial plant in operation next summer. Engines have been ordered from the Allis-Chalmers Company and boilers from the Coatesville Boiler Works, Coatesville, Pa.

The drought in New England has been somewhat alleviated by thaws and light rains that came before the usual time this winter. Water power is still insufficient in the rivers and smaller streams, so that most plants are using steam almost exclusively for power, and some establishments are seriously crippled, even to the point of shutting down for a portion of the time because of lack of water. But the most serious menace, lack of water for manufacturing purposes other than power, is believed to have disappeared, the only possibility of famine being the failure of the usual January thaws.

## The Buffalo Portable Punch and Shear.

For a portable hand operated punch and shear the one illustrated herewith is claimed to do the heaviest work of any now on the market. It is a new product of the Buffalo Forge Company, Buffalo, N. Y., and is described as capable of easily shearing bars from ¾ x 2½ to ½ x 6 inches, or punching holes up to ¾ inch in ⅝-inch plate. The shear will cut angle iron up to 6 x 6 inches in two cuts, and the punch has a throat depth allowing it to punch to the center of a 20-inch circle. The jaws of the shear will open a 7-inch cutting length for light work. The punch is at a level of 18 inches from the floor and the shear 4 feet from the floor. The shipping weight is 1400 pounds.

The machine is built of light castings held between




The New Portable Punch and Shear Built by the Buffalo Forge Company.

side plates of ½-inch armor plate steel, which take the strains of punching and shearing. The construction is one which combines lightness with strength and reduces the likelihood of broken parts. Power is applied to the punch and the shear through a toggle joint actuated by the lower lever shown in the engraving. A ratchet arrangement in connection with this lever allows the shear and punch to be opened quickly by simply raising the upper lever. The latter is known as the releasing or overhauling lever, and enables work to be quickly and accurately adjusted or released without a reverse movement of the working lever. All bearing points subject to heavy strain are shod with steel. The entire machine is mounted on a substantial truck, upon which it may be easily moved from place to place in the shop. The few moving parts and powerful leverage employed make it simple and efficient.

This combined punch and shear has a wide field of adaptability. Being portable and capable of doing fairly heavy work, it may be used in different parts of the shop where a power punch or shear is not accessible. It is especially useful in blacksmith and structural iron shops or wherever the quantity or weight of the work makes it easier and more economical of time to take the punch to the work instead of the work to the punch.

## The Hancock Globe Valve.

A number of new features characterize the globe valve which has recently been brought out by the Hancock Inspirator Company, 85 Liberty street, New York City. Among these the most notable are the way in which the valve is guided on the stem, the use of a flat instead of a taper valve seat, of a very narrow flange on the bonnet where it fits on the valve body, of a tee handle and the way in which the latter is attached to the stem. Four standard forms are made—globe, angle, 60-degree and cross valves—and all are made either for screw or flange connection. The sizes range from ¼ to 3 inches. There is one standard weight for all pressures. Each valve before shipment is tested under 1000 pounds hydraulic pressure.

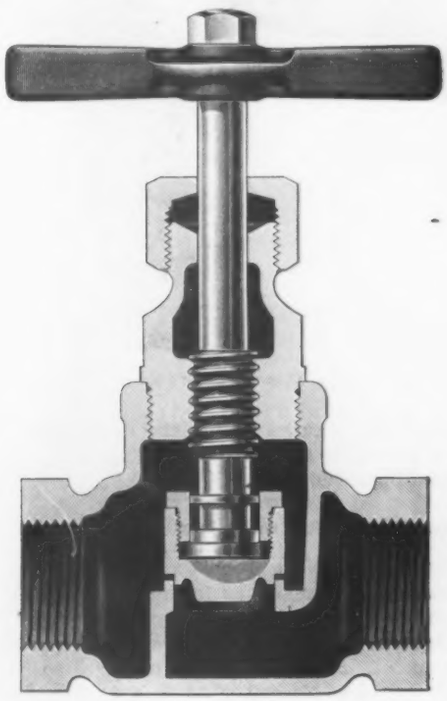


Fig. 1.—The New Globe Valve Manufactured by the Hancock Inspirator Company.

All valves are guaranteed to be tight for 500 pounds steam pressure. The valve body is made of a special composition, selected for its strength and wearing qualities. The disks are also of a special mixture, which does not contain zinc. The spindles are of Tobin bronze. The design of the body provides for an even distribution of metal for uniform strength, with ample area in the steam passages.

The novel manner of guiding the valve stem is shown in Fig. 1, which is a cross section of the valve. There are two collars, or guides, upon the stem, which guide the disk nut, compelling it to seat squarely and preventing it from cocking. Several advantages are claimed for the peculiar form of the valve seat. The projection on its lower side acts as a guide when the seat is ground, and also serves to prevent the cutting of the seat by the wire drawing of the steam when the valve is opened very slightly, as in the illustration. In this position the escaping steam cleans the seat, so that when the valve is seated all dirt and foreign matter has been washed or blown off. The result, as experience has shown, is that the valve requires very little regrinding to make it tight after it first begins to leak.

The bonnet of the valve has a very long thread as well as a narrow shoulder. With this construction it is

claimed that it is easier to keep the bonnet tight and also that it is much easier to unscrew it when occasion requires. To regrind the valve the bonnet is removed, the disk nut unscrewed from the seat and a piece of wood inserted in the disk. No special tools are necessary. The projection on the disk guides it so that it may be ground perfectly.

The tee handle as used on the Hancock valve has become popular on account of the ease with which it will open and close the valve. In places where economy of space is of importance or where there are many valves close together, as on steamships, its advantages are apparent. The peculiar manner of attaching the tee handle is shown in Fig. 2. The hole in the handle and the spindle of the valve are formed with the same taper and have flat spots on one side, which register. The handle is held on the spindle by a nut, and the flattened side prevents it from twisting on the spindle, while the taper allows it

Fig. 2.—Manner of Attaching the Handle of the Hancock Valve.

to be drawn tight, avoiding the annoyance of it working loose. This method of attaching has proved to be a decided improvement.

## November Iron and Steel Exports and Imports.

The value of November exports of iron and steel and manufactures thereof, not including ore, in the month of November was $12,831,980, as compared with $12,798,481 in October, according to the report just issued by the Bureau of Statistics. The total value for the 11 months ending November 30 was $118,182,998, as compared with $89,682,747 in the corresponding period of 1903. The total exports of iron ore for the eleven months were only 203,395 gross tons. A reduction is observed as compared with October in the exports of commodities for which quantities are given. These exports for November totaled 121,709 gross tons, as compared with 129,557 tons in October, 131,886 tons in September, and 101,124 tons in August. The detailed figures for the month and 11 months are given in the following table:

*Exports of Iron and Steel.*

| | November. | | Eleven months. | |
|---|---|---|---|---|
| | 1904. | 1903. | 1904. | 1903. |
| Commodities. | Gross tons. | Gross tons. | Gross tons. | Gross tons. |
| Pig iron | 2,530 | 1,777 | 45,884 | 15,309 |
| Scrap | 642 | 898 | 25,424 | 5,289 |
| Bar iron | 2,396 | 2,083 | 27,288 | 19,020 |
| Wire rods | 3,528 | 818 | 18,045 | 21,344 |
| Steel bars | 1,741 | 578 | 23,347 | 15,080 |
| Billets, ingots, blooms | 20,547 | 296 | 296,162 | 1,380 |
| Hoop, band, scroll | 395 | 320 | 2,999 | 1,941 |
| Iron rails | 15 | .... | 1,402 | 143 |
| Steel rails | 53,723 | 5,144 | 395,799 | 23,134 |
| Iron sheets and plates | 356 | 140 | 4,254 | 4,641 |
| Steel sheets and plates | 8,883 | 1,611 | 46,995 | 11,609 |
| Tin plates and terne plates | 975 | 33 | 7,359 | 203 |
| Structural iron and steel | 6,267 | 2,533 | 49,778 | 27,626 |
| Wire | 14,171 | 10,355 | 108,407 | 98,562 |
| Cut nails | 538 | 473 | 8,616 | 8,195 |
| Wire nails | 4,711 | 3,102 | 28,420 | 28,720 |
| All other, including tacks | 291 | 129 | 2,696 | 2,062 |
| Totals | 121,709 | 30,290 | 1,092,875 | 284,258 |

The imports in November fell even below those of October, which were comparatively insignificant. The value in November of imports of iron and steel and manufactures thereof, excluding iron ore, was $1,542,883, while for the 11 months ending November 30 the total value was $19,946,080. The imports of iron ore for the 11 months amounted to only 421,264 gross tons. Taking the commodities for which quantities are given, the November total was only 13,893 gross tons, as compared with 20,575 tons in October, 21,006 tons in September, 20,878 tons in August and 21,891 in July. The detailed figures for the month and 11 months are given in the following table:

*Imports of Iron and Steel.*

| | November. | | Eleven months. | |
|---|---|---|---|---|
| | 1904. | 1903. | 1904. | 1903. |
| Commodities. | Gross tons. | Gross tons. | Gross tons. | Gross tons. |
| Pig iron | 5,391 | 18,765 | 73,685 | 584,855 |
| Scrap | 628 | 2,457 | 12,434 | 80,396 |
| Bar iron | 1,660 | 2,575 | 18,800 | 39,408 |
| Rails | .... | 3,395 | 37,444 | 93,488 |
| Hoop, band and scroll | 2 | 32 | 1,944 | 1,519 |
| Billets, slabs, bars, &c., steel in forms n.e.s. | 691 | 6,580 | 10,271 | 260,223 |
| Sheets and plates | 232 | 2,917 | 4,008 | 11,078 |
| Tin plates and terne plates | 3,878 | 4,711 | 64,946 | 44,860 |
| Wire rods | 1,000 | 1,977 | 14,062 | 19,012 |
| Wire and articles made from | 275 | 386 | 3,646 | 4,540 |
| Structural iron and steel* | 88 | 1,722 | 6,983 | 7,942 |
| Chains | 37 | 34 | 346 | 365 |
| Anvils | 11 | 14 | 134 | 215 |
| Totals | 13,893 | 45,565 | 248,703 | 1,147,901 |

* Included in "All other" prior to July 1, 1903.

It will be observed from the above table that, as compared with the previous year, the imports for November and for the 11 months ending with November show a very great falling off.

## Pacific Coast Trade.

SAN FRANCISCO, CAL., December 24, 1904.—Although the year is not quite ended, it is evident that the total importations of foreign pig iron will fall about 2000 tons short of those in 1903. During November the imports were 1054 tons, valued at $12,014. Since then enough has come to hand to make up roughly 20,000 tons for the year of an average value of $12 per ton. The importations for November were about two-thirds English, the rest coming from the Continent of Europe, including Germany, Belgium and France. We used to import a good deal of French pig iron, but recently have imported comparatively little. The bar iron imported in November was 228,480 pounds, valued at $4093, from Sweden and selling in the Swedish market at about $39 per ton. Importations of steel billets for eleven months of the year were 6,396,454 pounds, valued at $78,894. There is a wide divergence in the price and character of the foreign steel billets brought to this market. None but the more expensive descriptions are imported. Of wire of various values imported during the middle of the year there was a total of 1,000,661 pounds, valued at $53,666. In 1903 our importations of structural iron and steel, principally from Belgium, were very heavy, but the amount fell off during the past year to a comparatively small quantity, although 6,056,783 pounds, valued at $90,091, came along, principally in the months of February and March. No importations have been made since last April, the Eastern establishments being able to supply all that we needed. There are a large number of skyscrapers with steel frames going up in the city, but the material will come from Eastern industrial establishments.

Many of our leading citizens deplore the necessity that obliges us to depend on foreign and Eastern industrial establishments for the raw material of so many of our industries and from time to time efforts have been made to finance institutions that will supply this material and plans have been laid out for the establishment of plants at San Francisco Bay and in Southern California. But nothing has come of them. Some are talked of but there is no sign of their materialization.

One by one the pioneers of our California industry have passed away, and comparatively few are now left. One of the last, Abner Doble, has just passed away. He was the founder of the Abner Doble Company, one of the largest manufacturers of iron and steel goods in this city. The foundation of this plant was a blacksmith shop that Mr. Doble ran for nearly 40 years. He may be regarded as one of the founders of our iron industries. He was about 75 years old at the time of his death. For some years he had taken no active part in the management of his business, which is conducted by his sons. He was one of the best types of the old style Californian —bluff and generous.

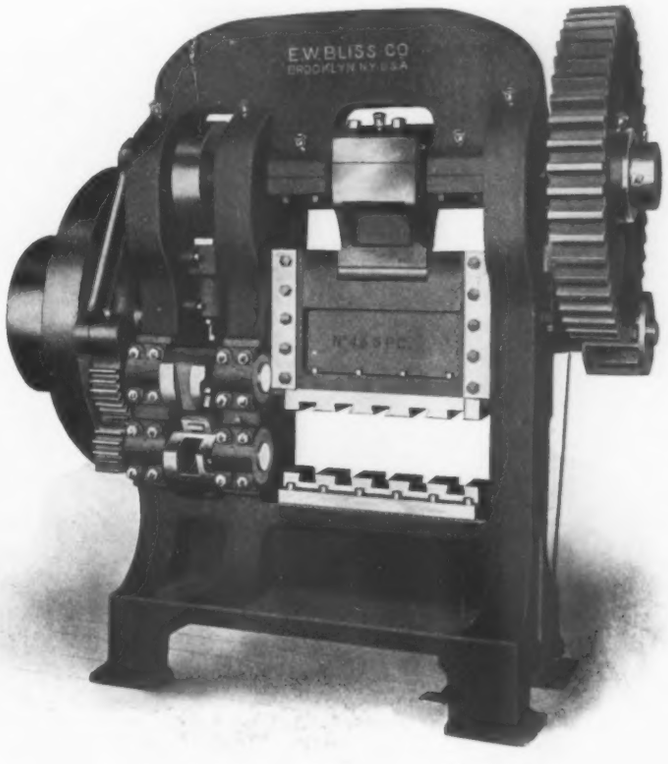
As the year draws to a close, the prospects for the farmers and orchardists continue to improve. We have had very little rain, but still it has been distributed in a way to do the most good for the agriculturist. Just as it seemed that the ground was about to get too hard for the plow, some timely rains would fall. The hardware houses are now taking stock, as also are the retail establishments in the city and country, and business has eased up according. On the whole, 1904 has been a very good year for both wholesale and retail trade. Owing to the building boom in this city local trade has been unusually good. J. O. L.

On Wednesday evening, January 18, while the automobile show is in progress in New York City, the Hyatt Roller Bearing Company, Harrison, N. J., will entertain a large number of well-known mechanical engineers and automobile manufacturers at a banquet and vaudeville entertainment to be given at Bretton Hall Hotel, Broadway and Eighty-sixth street, New York. The arrangements include the chartering of a special train of the Subway system for carrying the guests to the hotel after taking an inspection trip over the route. The invitations to the affair, which are very handsome, are accompanied by an excellently arranged booklet in which the "Hyatt Idea" is described in two chapters, the first dealing with its conception and the second concerning the realization. This is a very clever bit of work and is characteristic of its author, Peter S. Steenstrup, secretary of the Hyatt Company.

## A Special Bliss Forging Press.

A novel double crank forging press having an auxiliary equipment particularly intended for such special work as the rolling of tapers on claw hammers has recently been brought out by the E. W. Bliss Company, Brooklyn, N. Y. The press, shown in the accompanying illustration, has machine steel upper and lower die holders under the main crank, while a crank at the end of the main shaft operates two sector gears attached to rocking die holders, this being the part which is used for the rolling of tapers. The operation of the press will be readily understood from the engraving. The forging dies are held in dovetails, as shown, and the rocker dies are held in a similar manner.

A noticeable feature of the press is that the main slide is actuated by one wide pitman instead of two narrow ones, thereby affording a better support for the shaft and permitting of more compact construction. The driving shaft, carried at the rear of the press, runs continuously and may be clutched to a gear which drives the upper shaft with a ratio of 6 to 1, giving the press a working speed of 45 strokes per minute. The clutch is controlled by a foot treadle at the front and right side. The total weight of the press is 12,000 pounds. The distance between the main columns is 29¾ inches and between the secondary columns 7½ inches.




The Bliss Forging Press with Taper Rolling Fixture.

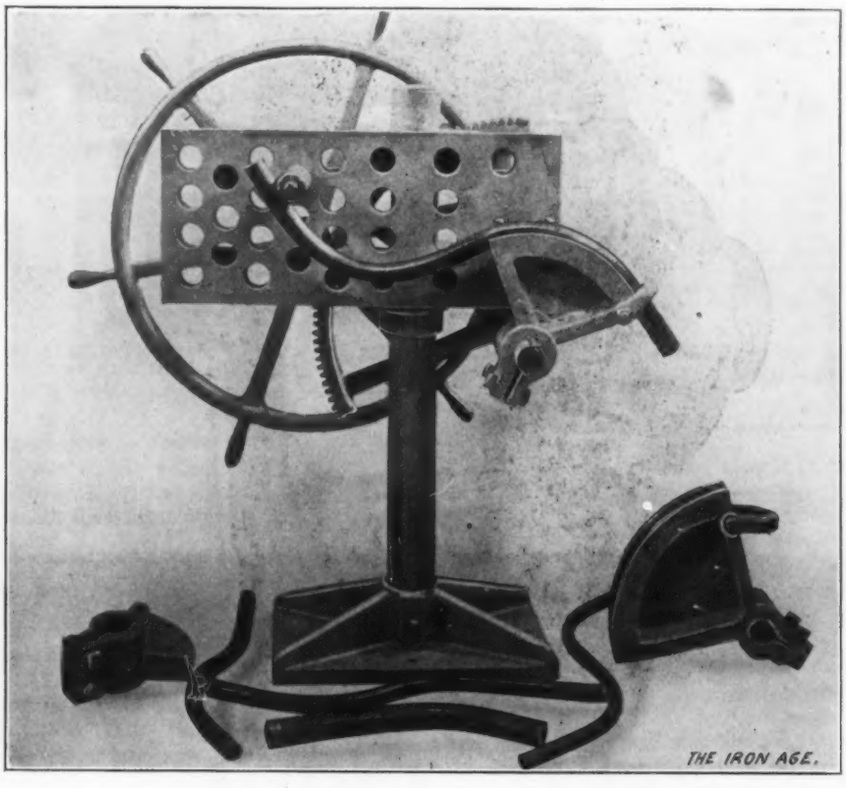
**Additional Awards at St. Louis.**—Berger Mfg. Company, St. Louis, Mo., two gold medals, one of which was on metal ceilings and the other on metal furniture and metal filing devices; Stanley Rule & Level Company, New Britain, Conn., grand prize; Standard Sanitary Mfg. Company, Pittsburgh, Pa., grand prize; Welsbach Company, Philadelphia, incandescent gas mantles and burners, gold medal.

The Illinois Manufacturers' Association will hold its annual meeting and banquet at the Auditorium, Chicago, January 6. Officers will be elected at that meeting, and addresses will be delivered by Dr. Frank Gunsaulus, Levy Mayer and others.

## The Pedrick & Smith Pipe Bending Machine.

A new machine for bending pipe without it being previously heated is illustrated herewith. The manufacturers and patentees, Pedrick & Smith, 222 East Girard avenue, Philadelphia, Pa., claim that metallic pipe of any kind, such as iron, steel, brass or copper, of a diameter up to 2 inches, may be bent cold without fracturing it or deforming its cross section. As the illustration shows, its design is simple and there are no complicated parts.

The bending is accomplished by manipulating the pilot wheel. This carries a pinion engaging a segment gear, to which the bending quadrant is attached. The bending quadrants are steel castings and are supplied for 1, 1½, 1¾ and 2 inch pipe. The end of the pipe which is to be bent is held in position by a clip at one side of the quadrant, while a pin in the back plate of the machine engages the other end of the pipe. The pin may be placed in any one of several holes, to engage the pipe at any point, irrespective of the position or the size of quadrant being used.




The Pedrick & Smith Machine for Bending Cold Pipe.

It is stated that complex bendings may be made by an inexperienced operator in less time than would be required by other means of bending, and that one man can bend a 2-inch pipe into S shape in three minutes. The machine is light and can be moved from place to place. It may be attached to a pillar, post or stanchion, or if none of these is available a stand is furnished by the manufacturers. Galvanized or tinned pipes or pipes coated by the Sabin process, it is said, may be bent to any desired shape without breaking the coating.

Over 300 members of the Interstate Independent Telephone Association, which had been in convention at Chicago, were conveyed on a special train from Chicago to Waukegan, December 24, and in the latter city made a tour of inspection of the plant of the American Steel & Wire Company. During the whole trip the delegates were guests of the company, which provided the special train both ways and an elaborate luncheon at Waukegan.

Frederick A. Bigelow has resigned his position as manager of the Providence, R. I., branch of the Crucible Steel Company of America, in order to take charge of the New England business of the Carpenter Steel Company. It is thought likely that James B. Callom will succeed Mr. Bigelow in Providence.

## National Metal Trades Association Notes.

CINCINNATI, OHIO December 31, 1904.—The records of the Chicago Metal Trades Association's Labor Bureau for the week ending December 29 indicate that the supply of machinists in that city is in excess of the demand.

A meeting of the Boston Metal Trades Association was held at the Trade Club December 28. Commissioner Eagan was present and made an address. Geo. H. Ellis, president of the United Typothetæ, gave an interesting talk on the local printers' strike, which occurred in the spring of 1904, a complete account of which appeared in the September edition of the *Bulletin*. The records of the Boston Labor Bureau for the week ending December 28 show that the supply of labor is greater than the demand.

W. C. Gentry, secretary of the Manufacturers' Association of Pittsburgh, advises that labor conditions in that city are much better than they have been for some weeks previous. W. P. Eagan, commissioner, who has been in the East for several weeks in the interest of the association, was called home suddenly by a telegram announcing that his mother had suffered a stroke of paralysis.

The affairs of the National Metal Trades Association, according to the records of Secretary Wuest, are in much better condition than ever before. This would apparently indicate that the leaders of the various labor organizations with which the members of the association come in contact recognize that it is not wise for them to create labor difficulties with that association.

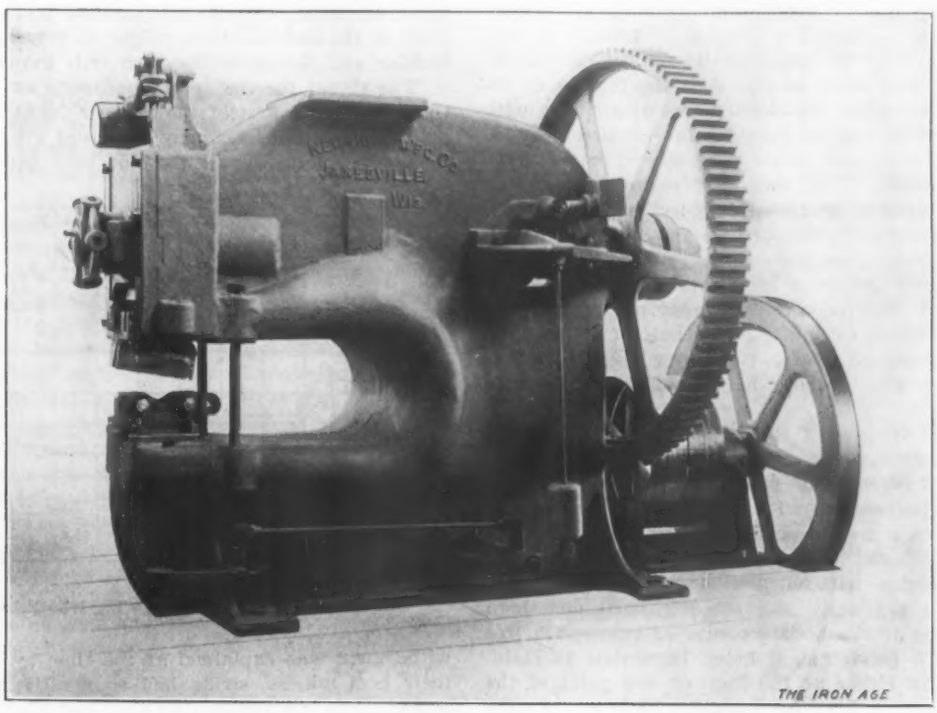
The Executive Committee of the Cincinnati Metal Trades Association has decided on February 9 at the Business Men's Club as the time and place for holding the next quarterly meeting. This will be immediately preceded by a dinner for the members of the association.

It would appear from the number of technical papers that are being prepared by the superintendents and foremen of the members of the Metal Trades Association that there will be a great number of enthusiastic meetings during the coming year. These meetings have been productive of an immense amount of good in which both the men and their employers have participated.

## A New Doty Punch and Shear.

One of two machines recently built for the Duluth, Missabe & Northern Railway Company by the New Doty Mfg. Company, Janesville, Wis., is shown in the accompanying engraving. It may be used either as a punch or a shear. As the former it has a capacity for punching a 2-inch hole through a 1¼-inch plate, and when equipped with shearing attachments it will cut plates up to 1⅛ inches thick, flat bars up to 8 x 1½ inches, round bars up to 2⅜ inches in diameter, or 6 x 6 x ⅝ inch angles. Machines of this style are made in nine sizes, varying in depths of throat.

The machine is self contained and of a generally heavy, strong design. The eccentric shafts are of hammered wrought iron or steel, as preferred. The journals of the driving shafts are placed so that they may be removed without disturbing the gearing. The sliding heads are counterbalanced. The machine is easily converted from a punch to a shear, or *vice versa*.




The New Doty Mfg. Company's Latest Convertible Punch and Shear.

## Recent Customs Decisions.

The Board of United States General Appraisers sustained, on December 31, a protest by R. D. Wood & Co., Philadelphia, against the classification of certain steel plates as boiler plates at 6-10 cent a pound, under paragraph 126 of the Tariff law. The plates are 12 feet long by 59 inches wide and 5-16 inch thick. They are checkered on one side and are used for flooring in boiler rooms. The importers claimed that they were dutiable at 4-10 cent a pound under paragraph 135, as steel plates not specially provided for, and the claim was sustained. This was the rate originally returned by the appraiser, but the collector insisted on the higher classification.

The board on the same day also handed down a decision overruling a protest by Morse & Whyte, Boston, against the classification of brass wire cloth as an article manufactured from wire at 45 per cent. and 1¼ cents a pound. The importers claimed that it was dutiable at 45 per cent. under the omnibus clause for manufactures of metal.

On the same day the board overruled protests by Eugene Munsell & Co. and the National Gum & Mica Company, New York, against the classification of mica splittings coated with shellac as rough trimmed mica at 6 cents a pound and 20 per cent. The importers claimed that the goods were dutiable as nonenumerated manufactured articles at 20 per cent. The decision says that the coating does not change the character of the merchandise.

On December 29 the board overruled a protest by J. W. Hampton, Jr., & Co., New York, claiming that duty had been assessed on an excess of weight on an importation of pig iron.

On the same day a decision was handed down overruling a protest by R. F. Downing & Co., New York, against the classification as manufactures of metal, at 45 per cent., of metal disks from which phonograph records are made. The importers claimed that the goods were electrotype plates and therefore dutiable at 25 per cent.

On December 28 the board overruled a protest by Hermann Boker & Co., New York, against the classification as iron or steel wire not specially provided for at 45 per cent. of an article described as a wire composed of iron and nickel. The evidence showed that in the manufacture of the article an iron or steel wire core is forced into a nickel tube or shell, and both are then drawn down to the required size. The decision says: "As imported, the merchandise is iron filled nickel wire, and as it is not one of the species of wire denominatively provided for in the paragraph in question (134), it is clearly dutiable as assessed."

W. S. Montgomery, who was for many years sales manager for the Conover Condenser Company, and for the past year New York manager for the Payne Engine Company, has severed his connection with the latter concern and formed a partnership with G. M. Rogers under the firm name of Rogers & Montgomery, with offices at 147 West Twenty-third street, New York City. The new firm will deal in a general line of small labor saving tools and hardware specialties, and is the exclusive United States sales agent for the new line of patented hand and press punches lately brought out by the Gem Tool Works of Brooklyn.

The Westinghouse Machine Company, Pittsburgh, received last week an order by cable from Japan for 13 steam engines of 125 horse-power each, to be delivered as soon as possible. These engines will be built at the West Pittsburgh plant.

# The Chicago Iron Trade in 1904.

BY R. R. SHUMAN, CHICAGO.

The history of 1904 may be divided into two chapters, differing radically from each other. The first chapter, representing the first eight months of the year, was one of disappointment after disappointment, of alternate hopes and fears, the hopes being dashed and the fears being realized in double proportion. Time after time powerful influences would labor to cause the market to rally. These giants would for a time have sufficient power to stay the downward course of prices, but at last their strength would give out and the floods would be let loose only to rush downward with greater force. The inexorable law of supply and demand was demonstrated during the first six months of 1904, if it ever was in the history of commercialism. Yet one of the enigmas that will never be solved is the laxness of demand in a time when the country was overflowing with wealth. That it was a Presidential election year of course played some part in the weakness of prices in the first eight months. The fact that railroads, suffering from the collapse of financial bubbles, had withdrawn from the markets as buyers of iron and steel was a still more potent factor, but even these two great influences combined should not have been able to force prices to the low levels and to cause so great a stagnation of business as existed during the first half of 1904 in the face of great national wealth, the very widespread industrial prosperity and the large balance of foreign trade in our favor.

The second chapter of the year is one in which the patient suddenly recovers from a condition almost comatose to one of feverish activity. The awakening was so abrupt as to be received with incredulity by buyer and seller alike, but a great reserve force from some quarter became manifest, and it now looks as if the upward tendency which began with such a startling impulse will be carried on gradually and steadily until new high records may be attained. The course of business is like the swing of a pendulum, it being impossible to maintain the weight either at the high or low point of the arc. It is first too high for stability, then too low for endurance, but it is this change that keeps up the never ending activity of business life. The dead level is as fatal to progress in business as it is to a pendulum or to human energy.

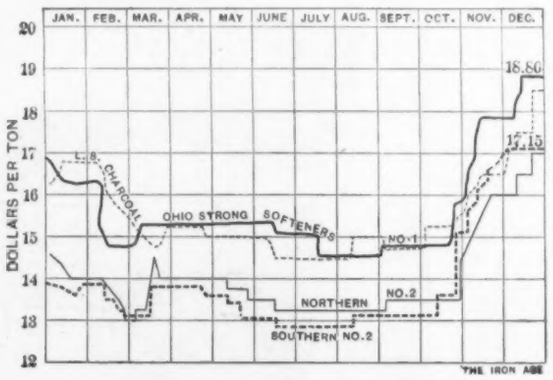
In the course of markets in both raw materials and finished products a condition unusual to Presidential years was experienced. The weeks immediately preceding the election of a President generally show great fluctuation and weakness, and the period immediately following shows an abrupt movement either upward or downward, according to the supposed attitude of the victorious party in respect to industries. The election of President Roosevelt was not preceded by a period of fluctuation and was not followed by a period of sharp advances, but, rather, the advances began six or eight weeks before election day and moved steadily upward across the line of November 8 without a quaver, indicating of course that the election of a candidate approved by business interests was assured many weeks before election day.

Taking the materials in their natural sequence we first discuss pig iron and scrap iron and steel.

### Pig Iron.

As will be seen by the accompanying diagram, pig iron crossed the line into the year 1904 on its rapid coast down hill, a decline which had been almost continuous since the autumn of 1902, reaching the bottom the first week in March and rebounding under the influence of heavy purchases made by the United States Steel Corporation. Thence its course lay mainly along a level through the early spring months, meeting still further reverses in June and July. About the middle of August it began to be evident that the corn crop would be an extremely large one and that the agricultural wealth of the country in general would be greatly enhanced by the crops to be harvested in the autumn. A great deal of business was done at the low figures by furnaces, for which they are sorry now, as during the dull periods of midsummer, 1904, there seemed to be but little light ahead, and makers concluded that it was wise to book tonnages far into the year at prices that showed at least a small working profit. It was a buyers' market all through the first eight months of the year, and there are thousands of buyers who are now chiding themselves for not having taken advantage of their commanding position when they were in the saddle. How rudely they were unhorsed in October and November they now only too clearly recall.

The signal for the general advance on pig iron was the withdrawal first of the Pioneer furnaces of the Republic Iron & Steel Company, followed a couple of weeks later by practically all the Southern producers. This




Graphic Illustration of Chicago Pig Iron Prices in 1904.

withdrawal was explained at the time by the fact that their coal miners' strike had so greatly restricted the output of their furnaces that they had already booked as much business as they felt safe in assuming under then existing conditions. They informed their patrons that it was not likely that they would reopen their books until a price of $12 was reached. At the time of the withdrawal prices were ruling at from $9 to $9.50. The stand taken therefore by Southern producers was considered visionary, and buyers were not at all disposed to take it seriously. However, the Southerners for once held firm and actually stayed out of the market for a number of weeks. The signal for their re-entry was the purchase by the Allis-Chalmers Company toward the end of October of some 40,000 tons of pig iron, possibly one-quarter of which was placed with Southern furnaces on the basis of $12, Birmingham, the balance being Northern iron bought at from $13.50 to $14.50. At once the market was thrown into a condition of chaos. Buyers who had all along held that $9.50 was a high price for Southern iron and $13.50 for Northern began bidding feverishly for Southern iron at from $12 to $12.50, Birmingham, or $15.65 to $16.15, Chicago, and Northern iron at from $15 to $16. Southern furnaces quickly advanced their prices in line with the increased demand, but Northern producers held back, fearing that the rise was fictitious and would result in a collapse. Some Northern producers even continued to quote low prices in order to stem the tide, but it was without avail and prices steadily advanced, as shown on the chart, to the high points quoted in to-day's issue.

The following table of monthly averages of carload prices at Chicago, in conjunction with the chart, will give a comprehensive view of the pig iron situation in Western markets:

*Average Prices of Pig Iron, 1904.*

| Months. | Northern coke, No. 2. | Lake Superior charcoal. | Ohio strong softener, No. 1. | Southern coke, No. 2 |
|---|---|---|---|---|
| January | $14.12½ | $16.62½ | $16.42½ | $13.78¾ |
| February | 13.56½ | 15.87½ | 15.30 | 13.47¼ |
| March | 13.80 | 15.00 | 15.20 | 13.55 |
| April | 14.00 | 15.18¾ | 15.30 | 13.80 |
| May | 13.75 | 15.00 | 15.30 | 13.27½ |
| June | 13.35 | 14.70 | 15.15 | 12.75 |
| July | 13.25 | 14.50 | 14.78¾ | 12.83¾ |
| August | 13.25 | 14.87½ | 14.55 | 13.08¾ |
| September | 13.50 | 14.75 | 14.80 | 13.15 |
| October | 13.75 | 15.31¼ | 15.05 | 13.90 |
| November | 15.62½ | 16.37½ | 17.42½ | 16.33¾ |
| December | 16.60 | 17.80 | 18.50 | 17.15 |
| Average for the year. | $14.04¾ | $15.50 | $15.64¾ | $13.92½ |
| Average for 1903 | $18.88½ | $22.13¼ | $21.33 | $18.31¼ |
| Average for 1902 | 20.50 | 23.50 | 23.30 | 20.10 |
| Average for 1901 | 15.00 | 17.50 | 16.50 | 14.60 |
| Average for 1900 | 19.12½ | 22.00 | 20.75 | 18.35 |
| Average for 1899 | 17.65 | 19.80 | 19.67 | 17.75 |
| Average for 1898 | 11.00 | 11.60 | 12.00 | 10.45 |
| Average for 1897 | 10.60 | 13.00 | 12.25 | 10.25 |
| Average for 1896 | 11.70 | 13.62½ | 14.50 | 11.40 |
| Average for 1895 | 11.80 | 13.75 | 14.25 | 11.75 |
| Average for 1894 | 10.60 | 14.75 | 13.50 | 10.75 |

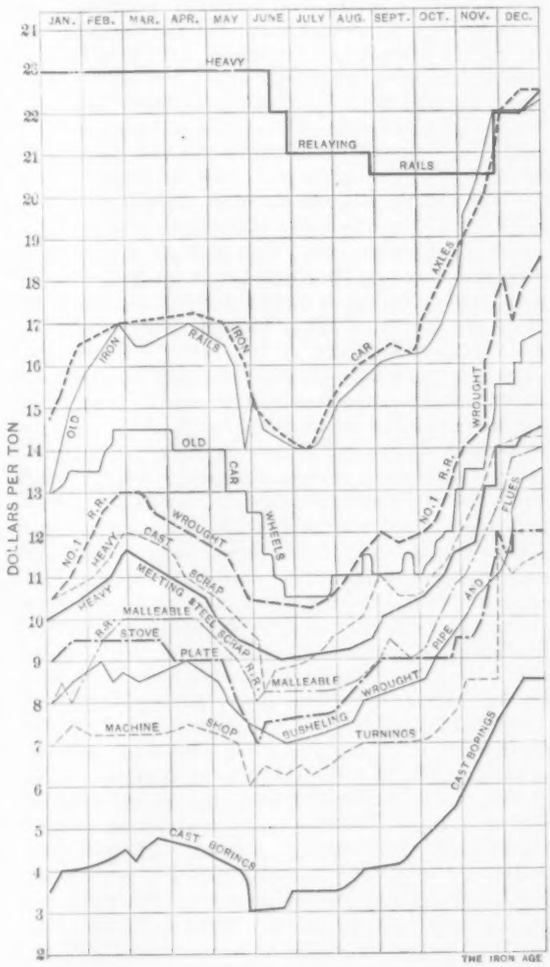
**Old Materials.**

We are wont to express surprise at the high prices now prevailing for old materials, and to conclude that they cannot be held at figures which seem fictitious. And yet a glance backward will almost suffice to change our attitude toward this important product. We find, for instance, that prices which prevailed throughout the last half of 1902 and the first half of 1903 were much higher than the present high figures, and the evenness and strength with which the prices were then maintained offer some indication at least that they were warranted by trade conditions. Add to this fact the knowledge that in the two years' period since then the production of open hearth steel has very greatly increased, with a constant increase in demand for scrap in proportion to the total tonnage of steel used in the country, to say nothing of the natural increment in the total tonnage of steel used because of increased population and industrial activity. On the other hand, the production of scrap has not greatly increased. Indeed, the lean days of the last half of 1903 and the first half of 1904 so greatly curtailed the cousumption of iron and steel as to materially reduce the available tonnage of scrap. To illustrate the general movement of old materials we present the following table, which shows the average prices of six commodities delivered at Chicago in carload lots:

*Average Prices of Old Material, 1904.*

| Months. | Old iron rails. Gross ton. | No. 1 railroad wrought. Net ton. | No. 1 busheling scrap. Net ton. | Heavy cast scrap. Net ton. | Heavy melting scrap. Gross ton. |
|---|---|---|---|---|---|
| January | $14.00 | $10.85 | $8.25 | $10.50 | $10.12½ |
| February | 16.50 | 12.50 | 8.68¾ | 11.37½ | 10.87½ |
| March | 16.60 | 12.80 | 8.55 | 12.00 | 11.50 |
| April | 16.87½ | 12.50 | 8.87½ | 11.12½ | 11.25 |
| May | 15.87½ | 11.37½ | 8.00 | 10.25 | 9.75 |
| June | 14.65 | 10.50 | 7.40 | 8.80 | 9.30 |
| July | 14.12½ | 10.43¾ | 7.12½ | 8.93¾ | 9.00 |
| August | 15.31½ | 11.12½ | 7.68¾ | 9.87½ | 9.25 |
| September | 16.00 | 11.85 | 8.00 | 10.70 | 10.00 |
| October | 16.68¾ | 12.50 | 9.00 | 11.05¼ | 10.87½ |
| November | 20.12½ | 15.43¾ | 11.00 | 12.68¾ | 12.55 |
| December | 22.00 | 17.55 | 12.60 | 14.15 | 14.15 |
| Aver. for year. | $16.56¼ | $12.45 | $8.76½ | $10.95½ | $10.72 |
| Average for 1903. | $20.28¾ | $16.07 | $12.05 | $14.74½ | $15.50½ |
| Average for 1902. | 23.91 | 19.68½ | 13.81½ | 15.03 | 17.37½ |
| Average for 1901. | 19.50 | 15.00 | 10.80 | 11.25 | .... |
| Average for 1900. | 17.90 | 15.00 | 8.00 | 11.00 | .... |
| Average for 1899. | 21.00 | 17.25 | 10.15 | 12.40 | .... |
| Average for 1898. | 12.37½ | 11.25 | 6.62½ | 8.15 | .... |
| Average for 1897. | 11.67 | 10.60 | 6.44 | 7.25 | .... |
| Average for 1896. | 13.50 | 11.20 | 7.00 | 8.48 | .... |
| Average for 1895. | 14.12½ | 11.08 | 7.67 | 8.37½ | .... |
| Average for 1894. | 10.83 | 8.80 | 6.85 | 7.50 | .... |

The course of the old material market during 1904 is so graphically illustrated by the accompanying chart that it is unnecessary to comment upon the markets month by month. The chart illustrates the hopefulness with which the various factors entered the year 1904. The bottom had been reached pretty generally in December, 1903, but in many instances the low figures of December were again reached and in some cases beaten during the midsummer of 1904. If the lines of the table could be extended to the left to cover the years 1903 and 1902 it would be seen that the lofty, almost level plateau of the last half of 1902 and the first of 1903 broke suddenly into a steep declivity leading down to December, 1903, as its lowest point, then rose into March and April of this year and then broke again into another valley of hard times. The steep upward slope of the lines on the




Graphic Illustration of Chicago Scrap Prices in 1904.

chart for September, October, November and December of this year indicates that prices recovered in a shorter time than it required them to sag in the first place. The Republic Iron & Steel Company, the leading consumer of scrap in the West, bought quite heavily during the low midsummer months, and when prices took an upward trend in October it announced to the trade that the movement of the market had no interest to that corporation because it had already received or contracted for a tonnage sufficient to carry it through the winter. However, about the middle of November the company, either for strategic purposes or because of the development of larger needs than had been anticipated, executed a brilliant flank movement, during which in a period of 24 hours an army of men was sent over the scrap districts of Indiana, Illinois and Missouri who bought up thousands of tons of old materials, taking practically everything in sight. The trade woke up the next morning to discover that scrap was from $2 to $3 a ton higher than it had been a day previous and that the available supply was very greatly curtailed. As is naturally to be expected in circumstances of that kind, prices went too high during the feverish excitement that followed the coup, and some of them broke 50 cents to $1 a ton a week later. This break, however, was only temporary, and prices again climbed up to the high level immediately following the Republic buying point.

The largest producers of old materials are of course the railroads, and during the early months of the year it was thought that the railroad purchasing agents who

are sellers of scrap were acting in concert in order to force up prices. List after list was promulgated, and buyers were informed week after week that their prices were not sufficiently high to take the business, the inference being of course that some other bidder or bidders had been higher. The fact developed in many instances that the materials were not sold at all, but were held for higher prices. This was a period in which the railroads were short of ready cash and they wisely made the most of their scrap asset toward supplying their actual necessities in new finished products. In some cases this was done by trading scrap for finished iron and steel, but in case the scrap was sold at all it was to the scared shorts at high prices and the cash turned into the treasury for the purchase of current necessities. This policy of the railroads of playing one bidder against another and of withdrawing the bulk of their tonnage served to check the downward trend of the market which was evident in the December previous and to bring about a steady advance, amounting to $1.50 a ton during February and March. The high prices of these months were also assisted by the unusually heavy snowfall, keeping out of the market a large tonnage of available materials. When snow melted in the spring the railroads threw the large tonnages on the market almost without reserve, and prices broke to points as low or lower than those of the December previous.

Advances since the low points of last July may be credited to a number of causes, the leading one of which is the general betterment of industrial conditions, due to good crop reports, &c., but back of this there was another cause—namely, the courage and foresight of dealers who bid in all available material and stored it in their yards, holding it out of the market until such a time as large profits could be realized. At first the general trade predicted nothing but disaster for dealers who were investing their money in a commodity that was apparently a drug on the market, but as the prices advanced week by week, and particularly when consumers saw that the dealers had the whip hand, a more respectful attitude toward the latter was very generally in evidence. Even to-day, with the high prices ruling, dealers are restricting their sales to the smallest possible tonnages, or as a usual thing just barely enough to keep their good customers supplied with actual necessities. The winter will doubtless bring long periods during which little scrap can be gathered from railroad tracks. Steel works are running full, and every consumer of scrap is likely to use larger and larger tonnages as the weeks go by, unless, of course, the activity in the iron and steel trade should collapse, a thing that is now scarcely feared.

### Steel Rails.

The official price on standard section rails did not vary at any time throughout the year and has been confirmed for 1905, and it is believed that at no time during the past year have rails been sold by members of the pool at less than official prices, though concessions were given in the shape of low prices on angle bars, bolts and spikes. This method of evading the official price was not covered by the terms of the agreement and was therefore officially legitimate. Light rails were quoted throughout the year at much lower prices than the standard section. Fluctuations are as follows: January 1 to February 11, $25; February 18 to March 31, $24.50; April 7 to May 12, $25; May 19 to June 9, $23; June 16 to July 7, $22.50; July 14 to August 25, $22; September 1 to November 3, $20; November 10, $21; November 17 to December 8, $22; December 15 to December 31, $24. Rail business during the year 1904 was extremely light, and had it not been for the fact that a goodly tonnage was carried over from the previous year on the books of the producing companies most of the mills would have been idle most of the time. Up to the last few weeks and covering a period of 18 months railroads pursued the policy of restricting their purchases to actual necessities in all lines of iron and steel, and particularly of course in rails, with the result that when all other conditions were present for industrial activity the steel business languished. Either by accident or design or by happy combination of both prices of raw materials advanced so rapidly during the last few months that the Rail Association was again able to affirm or perpetuate for another year the $28 price on standard section rails. Had the association met in October, as was its wont, there is little doubt that the pressure brought to bear upon its members would have been so great as to compel a reduction in the price.

### Finished Products.

The most striking feature of the finished material markets is the fluctuation of products supposed to be controlled by powerful associations. That these bodies exerted a steadying influence in spite of their failure to be able to hold prices up during the famine season is illustrated by the much greater irregularities in the prices of nonassociation products. The following summary of average prices for carload lots delivered in Chicago makes a presentation of market conditions in 1904 and previous years that tells its own story:

*Average Base Prices of Finished Iron and Steel.* 1904.

| Months. | Common bar iron. Cents. | Soft steel bars. Cents. | Angles, beams, channels. Cents. | Smooth machinery steel. Cents. | Open hearth spring. Cents. |
|---|---|---|---|---|---|
| January | 1.35½ | 1.46½ | 1.76½ | 1.71½ | 2.00 |
| February | 1.40 | 1.46½ | 1.76½ | 1.71½ | 2.00 |
| March | 1.48 | 1.49½ | 1.76½ | 1.74½ | 2.00 |
| April | 1.48¾ | 1.51½ | 1.76½ | 1.76½ | 2.00 |
| May | 1.45 | 1.51½ | 1.76½ | 1.76½ | 2.00 |
| June | 1.31½ | 1.51½ | 1.76½ | 1.76½ | 2.00 |
| July | 1.32½ | 1.51½ | 1.76½ | 1.76½ | 2.00 |
| August | 1.33¾ | 1.51½ | 1.76½ | 1.76½ | 1.90 |
| September | 1.35 | 1.49½ | 1.64½ | 1.74½ | 1.88 |
| October | 1.36½ | 1.46½ | 1.56½ | 1.71½ | 1.85 |
| November | 1.45 | 1.46½ | 1.56½ | 1.71½ | 1.85 |
| December | 1.63 | 1.50¼ | 1.60¼ | 1.75¼ | 1.89 |
| Average for year | 1.41¼ | 1.49½ | 1.70¾ | 1.74½ | 1.94¾ |
| Average for 1903 | 1.64¾ | 1.72 | 1.75 | 1.97¼ | 2.57½ |
| Average for 1902 | 1.71 | 1.73½ | 1.75 | 2.00 | 2.55 |
| Average for 1901 | 1.58 | 1.58 | 1.70 | 1.96 | 2.25 |
| Average for 1900 | 1.75 | 1.75 | 2.00 | 2.25 | 2.80 |
| Average for 1899 | 1.80 | 1.90 | 2.00 | 2.50 | 2.85 |
| Average for 1898 | 1.05 | 1.10 | 1.25 | 1.55 | 1.61 |
| Average for 1897 | 1.11½ | 1.13 | 1.19 | 1.53 | 1.66½ |
| Average for 1896 | 1.30 | 1.30 | 1.40 | 1.62½ | 1.87½ |
| Average for 1895 | 1.25 | 1.37½ | 1.50 | 1.70 | 1.85 |
| Average for 1894 | 1.10 | 1.25 | 1.40 | 1.70 | 1.85 |

### Steel and Iron Bars.

In soft steel bars a powerful association was at work during the year, but no herculean efforts were required to hold prices steady, because bars had entered the year on a relatively low basis and were *en rapport* with the cost of raw materials. But even though bars were reasonably low, independent mills in the West, notably the International Harvester Company and the Inland Steel Company, cut into the business of the associated mills, sometimes at great reductions in price. During a period when steel bars were held by the association at 1.51½ cents, Chicago, sales were freely made by the Harvester Company as low as 1.25 cents, but as the market strengthened these prices advanced to a point where they were not more than $1 or $2 below association figures.

The tonnage of bars consumed in the West was large in proportion to other steel products, but the prices of iron bars ruled so much lower than steel through a large portion of the year that consumers who could by any possibility use iron did so to the exclusion of steel. The low prices made on steel bars were to prevent this use of iron. Entering the year at 1.30 cents, iron bars advanced by easy stages until they reached 1.50 cents, Chicago, March 15; declined again in April and June, until about the middle of that month they were selling at 1.27½ cents, and as low as 1.25 cents. During a part of this period there were some makers of iron bars who waived the half extra clause and sold miscellaneous orders containing base and extra sizes at one base price, and that a low one.

Iron bars began to advance long before steel showed any strength. It was not a pulling but a pushing influence that brought about this result. Iron bars were literally forced up from below by the seismic upheavals of scrap iron below them. Of course as soon as they crossed the line of soft steel bars, beginning to be quoted higher than the latter in November, the tonnage of business fell off and buying became limited to requirements for which iron was so much better adapted than steel that it paid to pay the premium price.

Hoops were marked by unusually radical fluctuations

for this product. The three large factors who produce more than 90 per cent. of the total tonnage of the country had been able to maintain agreements from time to time that were sufficiently binding to hold prices on a fairly steady keel, but in February internal warfare broke out, and hoops, which at that time were quoted officially at 1.81½ cents, Chicago, tumbled precipitately to 1.41½ cents early in March, making a decline of $8 a ton in about five weeks' time. Even this was far from the bottom, as it later developed that sales were made in Illinois as low as 1.25 cents delivered. This had for a time a very demoralizing effect on soft steel bands and made it necessary for the bar mills to quote bands much lower than the official bar price. A truce was patched up by the middle of March and prices were advanced to 1.56½ cents, Chicago, or 1.40 cents, Pittsburgh, another $3 being added to this price the middle of June, making the ruling price for the balance of the year 1.71½ cents, Chicago, or 1.55 cents, Pittsburgh. Another influence that unfavorably affected hoops was the great strike that was waged against the packing interests of the country. Cooperage shops, both private and those owned by the packers, were at a standstill for a number of weeks, and hundreds of carloads of hoops that normally went into that industry were never shipped.

Hard steel bars, angles, &c., rolled from old rails, sold for a long time at from 1.15 to 1.20 cents, Chicago, but the advance in the cost of old steel rails forced these prices upward, until in December they were quoted but little below the official prices on soft steel.

### Cast Iron Pipe.

In the aggregate the year just closed has been a fairly prosperous one for the cast iron pipe interests. It is true that their business was considerably crippled by the late spring and by the flooded condition of the Middle West in the months of May and June, but a large and profitable business was done in Oklahoma, Indian Territory and the Southwest generally in March and April. The year opened with $27.50 gross ton, Chicago, as the official price for 4-inch pipe; went January 14 to $27; declined February 25 to $26; advanced April 21 to $27; declined again May 19 to $26, and further declined June 16 to $25.50, the lowest point reached for the year, and this price continued throughout the hot weather until it was raised to $26.50 September 15, owing to the rapidly increasing cost of pig iron, and to $27.50 the last week in November, for the same reason, this price being raised to $28.50 in December, making a net advance of $3 a ton from the low point of midsummer, although pig iron, which forms the basis of cast iron pipe, advanced at least $4.50 in the same length of time. No extremely large lettings came to light during 1904, the largest being 7000 tons bought by the city of St. Louis about June 1, 5000 tons by Kansas City in July, 5000 tons by Columbus, Ohio, and 2300 tons by Chicago in August. The largest proposition in prospect at this writing is about 30,000 tons required by the city of New Orleans, which it is expected will have been placed before this issue goes to press. A feature of the trade was the development in October of a scarcity of 4 and 6 inch pipe, and this scarcity continued well into the winter. Pipe foundries were occupied only part of the time, and if taken altogether possibly 50 per cent. of the maximum tonnage capacity was manufactured and marketed. In looking into the future the prospect is bright, owing to the fact that the greatly bettered financial condition of the country will permit municipalities to market their bonds on favorable terms, encouraging them to undertake many needed extensions which have been delayed because the past 18 months have furnished an unsatisfactory market for their securities.

### The Coke Market.

During a great part of the year the coke situation in Chicago and tributary territory was not a fair criterion of the condition of trade as seen from the producing fields. This was due to the fact that in the early months a scarcity of cars and a disinclination on the part of railroads to transport coke led to an artificial shortage, followed by a disastrous flood of coke late in the spring, after general business conditions had sagged to such a low point that but little coke was wanted by anybody. There were times when there were thousands of cars on sidings in Chicago paying $1 a day demurrage. Had this coke been received here at the time it was intended it would have greatly relieved its purchasers, but arriving six to eight weeks late it only made a bad condition worse. Hundreds of cars were sold in Chicago to local and neighboring industries for the freight alone, the owners bearing the loss of the material itself plus whatever demurrage had accrued. Another disturbing factor which made itself felt late in February was a cut in freight rates to Chicago, made by the Louisville & Nashville Railroad, from coke operations along its line, making the freight rate $2.25 a ton instead of $2.65, the rate ruling from all other coke regions. The fact that the coke produced in Wise County, Virginia, and other operations tributary to that road was of a high average quality made it only the more difficult for sellers of other cokes to compete in a market that was already demoralized by the release of the dammed up flood of coke above referred to. This condition is best illustrated by quoting the prices of coke per net ton delivered at Chicago at various periods in the year:

| | Connellsville foundry. | Connellsville furnace. | Other foundry. | Wise County foundry |
|---|---|---|---|---|
| January | $4.65-$4.90 | $4.15-$4.65 | $4.15-$4.65 | $4.15-$4.65 |
| February | 4.60- 4.85 | 4.15- 4.40 | 4.15- 4.40 | 4.25 |
| March | 4.65- 4.90 | 4.25- 4.40 | 4.25- 4.40 | 4.25 |
| April | 4.50- 4.90 | 4.25- 4.40 | 4.25- 4.40 | 4.25- 4.50 |
| May | 4.25- 4.40 | 3.50- 4.00 | 3.90- 4.00 | 3.90- 4.00 |
| June | 4.25- 4.40 | 3.90- 4.15 | 3.75- 3.90 | 3.50- 4.15 |
| July | 4.25- 4.40 | 3.90- 4.15 | 3.75- 3.90 | 3.50- 4.15 |
| August | 4.50- 4.65 | 4.25- 4.40 | 4.25- 4.40 | 4.00- 4.25 |
| September | 4.50- 4.65 | 4.15- 4.50 | 4.40- 4.50 | 4.00- 4.25 |
| October | 4.50- 4.65 | 4.15- 4.50 | 4.25- 4.40 | 4.25 |
| November | 4.90- 5.15 | 4.65- 4.90 | 4.50- 4.75 | 4.25- 4.50 |
| December | 5.15- 5.40 | 4.90- 5.15 | 4.90- 5.15 | 4.50- 4.75 |

The low prices in October were due not to the poor business condition but to a determined stand on the part of buyers not to pay greatly advanced prices—in other words, a deadlock. This was broken in favor of the producers a little later, mainly because of a scarcity of water in the coke fields, which enhanced producing cost and restricted output. A factor throughout the latter part of the year was the strike of the coal miners in the Southern fields, which made it necessary after local stocks were exhausted for Southern furnaces to import from the Virginia and West Virginia fields very large tonnages of furnace coke. This, added to the restricted output due to the water scarcity of the autumn months, was a potent factor in advancing the price not only of coke but later of pig iron.

**Sheridan Furnaces Sold.**—A deed has been placed on record at Lebanon, Pa., conveying to Robert E. J. Corcoran, Brooklyn, N. Y., the two blast furnaces at Sheridan, Pa., sundry lands and water rights and a one-ninety-sixth interest in the famous ore banks at Cornwall, Pa. The sale was made by the Pennsylvania Furnace Company, the late owner, for $180,000, early possession being given. The No. 1 furnace is 78 x 15 feet and was built in 1862 as a charcoal stack, but changed to an anthracite stack some years later. No. 2 stack is 75 x 16 feet and was built in 1875, being rebuilt in 1891. Their annual capacity has been rated at 60,000 tons. It is said they will be overhauled, as they have been idle since 1892, and will be operated. S. H. Chauvenet, late with the Robesonia Iron Company, Ltd., will be manager.

**Waterbury Farrel Thread Rolling Machine.**—A machine to thread the heavy bolts which will be used in the new Pennsylvania Tunnel under the Hudson River, at New York, recently built by the Waterbury Farrel Foundry & Machine Company, Waterbury, Conn., is probably the most powerful thread rolling machine ever made, as it is capable of rolling a thread 3½ inches long on a 1½-inch bolt. The machine is similar to the regular line of thread rolling machines built by the company. It is double geared from a driving pulley 43 inches in diameter by 7¼ inches face. It is provided with roller bearings to reduce friction, a quick return movement for the slide and an improved knock off.

# THE IRON AGE

1855—1905.

New York, Thursday, January 5, 1905.

DAVID WILLIAMS COMPANY, - - - - - - - - PUBLISHERS.
CHARLES KIRCHHOFF, - - - - - - - - - EDITOR.
GEO. W. COPE, - - - - - - - - - - ASSOCIATE EDITOR.
RICHARD R. WILLIAMS, - - - - - - - - - HARDWARE EDITOR.


## The Outlook for 1905.

To set forth a long series of reasons why a good business may be expected this year would be the orthodox way in which to write a forecast. But the conditions at this time are of such a character as to cause the presentment of this subject to be arranged in reverse fashion. To put it interrogatively, why is not a good year to be expected? Are there any clouds on the horizon? Is any kind or manner of business suffering from more than temporary or seasonable inactivity? Is any considerable number of people unemployed who desire to work? Has the purchasing power of the great mass of consumers been diminished to any extent by the developments of the past year in agriculture, mining or other of our productive industries? Is there at present any prospect whatever of curtailment in the demand for manufactured products? Answers to these questions are so uniformly favorable that he who would prefer to see business drooping and values declining must look further afield than can mere ordinary mortals. It may be possible that in the recrudescence of prosperity now being enjoyed by this country the seeds are being sown of a crop of adversity which must at some time be harvested. This is a law of nature, physical and economical, but so far as human foresight can take in the prospect which now stretches before us the year upon which we are entering appears exceptionally promising.

If we were celebrating a long period of great activity, with its inevitable accompaniment of expansion in productive capacity and indiscriminating haste to take advantage of fast flying opportunities, it might be well for us to speak cautiously, act warily and hold ourselves in momentary readiness to hedge against a shrinkage in the demand and falling markets. But it is barely three months since we emerged from a state of business rest and almost of stagnation which had continued for over a year. During that time ultra conservatism ruled. Consumption was certainly much under what it should have been to take care of natural waste and provide for reasonable growth. It is unnecessary to expatiate upon the causes which brought about the decline in trade. They have been exhaustively treated in these columns in the past, and it is enough to say that they are no longer operative. But now that the depression is ended we can derive some satisfaction from it through the realization that the economy in buying which then actuated consumers has turned itself into a present blessing of sustained orders, which in some instances have been of unprecedented volume.

Rarely has the iron trade of this country entered the winter with such pronounced activity in all departments as in the case of the current season. When the awakening demand first made itself felt in pig iron in September wise heads were shaking ominously, as it was considered quite out of the question that any great volume of business should develop in the autumn. As time wore on, and the activity seemed to confine itself to pig iron, the comparatively light trade in finished products became a matter of critical comment, and those who had misgivings about the strength of an autumn demand began to feel sure of their position. It is safe to say that everybody in the iron trade was taken by surprise when the buying movement was perceived to be spreading to finished products. So rapidly did the change occur that manufacturers were largely unprepared for it. Prices which had been with difficulty barely sustained by trade agreements were suddenly forced above the official schedules by the pressure for more rapid deliveries from eager buyers. As usual, advances in price stimulated trade instead of repelling it, and the close of the year found blast furnaces, rolling mills and steel works which had long been idle either actively at work or making vigorous preparations to resume operations. As an index to the condition of trade in finished steel products the status of unfilled orders on hand by the United States Steel Corporation may be cited. It has the equivalent of more than six months of its maximum output now under contract, with the rail trade heard from to but a limited extent. It may be assumed that the outside interests have fared equally well with the United States Steel Corporation. Thus for at least half of 1905 steady running seems assured for the finishing end of the iron trade. As to pig iron, the present rate of consumption leads to the belief that, unless prevented by inability to secure a sufficient supply of coke and ore, the production for the first six months of this year will exceed considerably the output in any previous half year.

This promising outlook has been gained with what may be considered as only the beginning of the demand for iron and steel from the railroads. They have been fairly liberal buyers of steel cars and locomotives within the past three months, but their orders will have to be very much larger to come up to the average of the five years 1899-1903, which should now represent approximately their normal requirements. Their purchases of rails and bridges for delivery this year have been quite light thus far. It is known that they expect to purchase quite heavily of these necessities for permanent way, as they stinted themselves in both 1903 and 1904. This year they will be more able to indulge in expenditures for renewals and improvements, as earnings for several months have shown a gratifying increase over the corresponding period of the previous year. Those who deem it desirable or find it necessary to raise funds through the issue of securities can do so with greater facility than for years, as money was never more abundant than now, and only in times of great depression have interest rates been so low. This ease in the money market should also prove advantageous to enterprises of all kinds, either new or held in abeyance by the depression of 1903-1904. As far as can now be seen the volume of business promises to be greater rather than less as time unfolds the scroll of 1905.

## A Year of Atonement.

A nation's sins are visited on it just as a man's are. The hard times of much of 1904 were nothing but a penance for the financial transgressions of the period preceding it. Overcapitalization of industries, inflation of values and general deception of the investing public brought about an inevitable day of reckoning, and it should be a matter of profound felicitation that this period of penance should have fallen on a year when the masses prospered as a result of bounteous crops. If the bursting of the financial bubble had been accompanied by a year of lean crops we would not be rejoicing in so speedy and solid a recovery of trade conditions as we

are to-day. The year has also been one of retribution in labor circles. Excesses in the industrial world had been accompanied by excesses in the labor world, culminating in the closed shop propaganda, with restriction of individual output as one of its cardinal principles. So acute had become the situation at last that rival employers, who had never before been even civil to each other, met in strong associations formed for mutual protection, with the result that the closed shop has been widely overthrown and the power of labor leaders greatly curtailed. The question now is whether both capital and labor will profit by their experience, or straightway begin again the commission of the sins for which both were soundly punished.

## New Railroad Construction.

Periods of business depression are always marked by a diminution in new railroad construction. This is due, of course, to inability to finance new undertakings as well as the husbanding of resources by established lines. Theoretically, the time to make any kind of improvements involving the expenditure of large sums for labor and materials would be when employment is slack and when manufacturers are making concessions to secure business; but this is seldom done. As the developments of 1903 were decidedly unfavorable to the marketing of securities it is not surprising that the mileage of new railroad construction in 1904 has shown a decided reduction on the immediately preceding years. According to the *Railroad Gazette*, the additions to main track of steam lines in the United States last year fell about 33 per cent. under the figures for 1903. The total for 1904, which specifically does not include second track nor sidings, is placed at 3832 miles, while in 1903 the similar mileage was 5652. It is further stated that the new construction last year is the smallest reported since 1898 when 3265 miles were laid. In the list of States showing new construction last year Texas leads with 323 miles, Missouri comes second with 270, Mississippi third with 268 and Minnesota fourth with 221. The smallness of these figures emphasizes the inactivity in this line of business enterprise.

It is interesting in this connection to note how new railroad construction has fluctuated in periods of business activity and depression. Taking the five-year period covered by the years 1899 to 1903, inclusive, the additions to main track annually averaged 5302 miles. In the five-year panic period covered by 1893 to 1897, inclusive, the annual average was 2000 miles. The average annually for the brisk times extending from 1886 to 1890, inclusive, was 7667 miles. The greatest period of railroad building was during the boom times following the resumption of specie payments, from 1879 to 1883, inclusive, when the annual additions to main track averaged 7935 miles. The panic period of 1874 to 1878, inclusive, depressed as all business then was, did not discourage railroad building as much as the depression in the 90's, as the annual average for that period was 2500 miles. That considerable activity had been shown in this direction prior to the panic of 1873 is demonstrated by the fact that in 1869 to 1873, inclusive, the annual average of new construction was 5608 miles.

The statistics of new mileage have to a great extent lost their value to students of production and markets. In the 80's especially, when an annual average of nearly 8000 miles was being added to main track throughout the decade, the question of new construction was a most important one. It was then one of the largest single avenues of consumption in the iron and steel trades. Not only were great quantities of iron going into rails, but the tonnage used in accessories and equipment for new roads was very large. Railroad projects were consequently followed up closely by students of the markets, and the prospects for higher or lower prices for iron and steel took their color from the outlook for new railroad construction. Then the railroad mileage in this country was comparatively small, especially when the fact is taken into consideration that only short stretches of line were double tracked and sidings and yards were limited. The extension of railroad trackage since 1890, by the laying of double and even third and fourth tracks, and the construction of numerous huge freight yards at every commercial center, has probably taken a larger tonnage of rails than the additions made to main track. The huge mileage thus in existence whose extent is not shown in statistical reports requires so great an annual tonnage of steel for renewals and improvements that the new construction considered in such figures as those presented by the *Railroad Gazette* has been relegated to a minor place. Nor will they ever be considered of serious moment unless we again have an era of great railroad expansion with a yearly construction of at least 10,000 miles.

## How Building Operations Are Retarded by Strikes.

The impediments to building construction in this city by reason of labor troubles are strikingly presented by the *Times*. That newspaper on January 1 celebrated the completion and occupation of its new building on Times Square, Forty-second street and Broadway, by the issue of an illustrated supplement describing the edifice, giving full engineering details of the construction and equipment. So faithfully is the history of the work presented that it includes an account of the numerous strikes which delayed its progress. Excavation began early in 1903. The first strike occurred on May 1, when 45 men employed in excavating quit work and were joined by the truck drivers, a demand for higher wages and shorter hours having been refused. This strike was lost in less than a month. On November 10 the bricklayers and apprentices struck in sympathy with a strike on another building, but returned in nine days on the payment of $610.05 for "waiting time." On November 21 the ironworkers were called out because of a difficulty between employers and the recognition of a union, staying out until December. On January 7, 1904, the limestone setters struck and were out six days. On March 7 the bricklayers struck and were out for a month. On April 1 the elevator workmen went out for a week. On July 18 the carpenters went out on a sympathetic strike which lasted a week. On July 26 the painters went out for five days, and on August 5 were out again for two days. On August 6 the second carpenters' strike took place, nearly a month elapsing until another force was secured. On the same day the elevator workmen went out again, also the electricians, plasterers and marblemen, while on August 9 the plumbers took a hand in the general controversy. The elevator men were back in three days, but the places of the others were not supplied for over a month. Summing up the time lost, the statement is made that 299 days' employment was sacrificed by the various trades involved. Of course all work was not stopped whenever a single trade went out, so that the completion of the building was not delayed the full 299 days. It is estimated, however, that but for these disturbances the

building would have been ready for occupancy eight months ago.

The *Times* Building is a typical modern office building, with the addition of basements specially constructed for presses, and therefore containing much heavy machinery. The delay in its completion caused by labor troubles is no greater than has been experienced by other builders of the same class of structures in every year of late, and in fact is not so serious as some have suffered. But it presents a most disheartening picture of the possibilities which confront those who contemplate undertakings of this character. Owners may make the most careful arrangements for the erection of a building, giving contractors a liberal allowance over the time they name for having it ready for occupancy, and then find that many more months are consumed because of labor disputes. No question of hours or wages may arise, the owners may give *carte blanche* to the contractors on such points, but disputes may crop up between trades which will be harder to settle and consume more time than if hours or wages were involved. If this question of uncertainty with regard to labor could be eliminated the building trade would be much more active.

## Theory Versus Practice in the "Closed Shop."

The American Economic Association, whose members are largely college professors, held a noteworthy three days' session in Chicago last week, during which at least one day was devoted to the discussion of "The Closed *vs.* the Open Shop." Rather as a surprise to that body itself came the discovery that a large majority of the members favored the closed shop because, they argued, that was the only means by which the individual laborer could sell his labor at its actual market value. And yet there need have been no surprise that college professors from their theoretical closets, isolated from the practical world, should have thrown their votes and voices on the side of what they believe to be the under dog in the industrial fight. For they are men of abstract philosophy coupled with broad humanitarianism. But let us bring it nearer home to the learned doctors. Suppose a working majority of the students of a university should form a secret society or union and wait on the faculty with the following code of rules:

1. This college shall be closed to all students not members of the Students Soldiering Association.
2. The S. S. A. shall have sole right to pass upon the admission and rejection of applicants for membership.
3. Should a student fail to pay his dues in the S. S. A., the faculty when notified by the steward of the S. S. A. shall forthwith suspend the delinquent student.
4. Hours of recitation shall hereafter be 30 minutes for each recitation, with full credit for 45 minutes.
5. The "passing" mark shall be reduced from 75 to 60 per cent.
6. Any student who receives a mark of over 80 per cent. shall be fined $1 for each unit per cent. received thereabove. Pacemaking will not be countenanced by the S. S. A.
7. The faculty will not be permitted to "flunk" any member of the S. S. A. for failure to pass recitations or examinations without the consent of the S. S. A.

Then, suppose the college authorities should refuse to accede to these typical closed shop declarations, and the working majority should resort to personal violence and destruction of property to enforce its demands, forming other associations of the kind in other colleges, and federating them into a national association, would not the learned doctors see that the student who was not a member of the Amalgamated S. S. A. of North America had certain rights that were being jeopardized, and that the cause of education was suffering from too much "closed shop"?

## Our Large Iron and Steel Exports.

Elsewhere in this issue will be found details of our imports and exports of iron and steel for the 11 months of the past calendar year, ending with November 30. Taking the commodities for which quantities are given, it will be observed that the imports have fallen to a very low point, while the exports have risen to large figures. During these 11 months the exports, excluding iron ore, were 1,092,875 gross tons, or nearly up to the total for the entire year 1900, which was the year in which the country made its best record in exports of iron and steel. It is certainly safe to say that when the figures for December shall have been made up it will be found that the exports for the full 12 months will establish a new record for this branch of our export trade. This record will probably stand for some time, as the domestic demand is now so heavy that foreign markets will not be so eagerly sought by our manufacturers. The contrast, however, between our foreign trade the past year and the condition of that trade in 1903 is striking. The situation has been completely reversed. Our imports in 1903 came very close to 1,200,000 gross tons and in the same year our exports were but a little above 300,000 tons. The imports for November, 1904, of commodities for which quantities are given were so small that it is doubtful if they have been less in any previous month unless perhaps at some time during 1897 or 1898, when the country was importing very little. It is worthy of remark that this reduction in imports of iron and steel comes at a time when our imports of general merchandise are running larger than at any previous time in the history of the country. The total value of merchandise imports for November was $95,208,172. It has seldom happened that our imports have run above $90,000,000 for any one month. On the basis of the 11 months' figures it seems clearly established that for 1904 our imports of merchandise exceeded $1,000,000,000 for the first time.

## The Improvement of the Ohio River.

The proposed Ohio River improvement, which is receiving some attention at Washington, presents a scheme of great magnitude. The cost is estimated at from $40,000,000 to $60,000,000 above improvements already provided for, yet the project is one that would seem to promise such immense advantages in the handling of Pittsburgh freights as to be considered an investment which should make good returns on the money. In a nutshell, this plan would insure a 9-foot channel from Pittsburgh to the mouth of the Ohio River at all seasons of the year. It would mean continuous water rates for coal and iron products not only to the mouth of the Mississippi River, but, to look a little ahead, across the Gulf of Mexico and through the Panama Canal to the Pacific Coast and the Far East. There is little doubt that such a waterway will eventually be constructed, in the natural development of the resources of the country, not only for the benefit of the Pittsburgh district and the coal regions and other territory on the Ohio system of rivers, but for the good of the country as a whole. The beginning of the project is already under way, in improvements of the Ohio River, which contemplate the construction of 37 dams between Pittsburgh and a point a short distance below Cincinnati, which will provide a 12 months' channel with 6 feet of water between these points. It is proposed to ask Congress for an appropriation which will give the 6 dams between Pittsburgh and Beaver Falls 9 feet of

water on their miter sills, which can be done at reasonable cost. This would greatly increase the storage capacity of Pittsburgh harbor, to take barges with 12,000,000 tons of coal from the Monongahela River, ready to descend the Ohio when the water below Beaver Falls becomes of sufficient depth in the spring. Such an improvement alone would be of great importance to vast interests.

## PERSONAL.

Silas J. Llewellyn has severed his connection with the International Harvester Company, but retains the presidency of the Chicago Malleable Castings Company, Chicago. Mr. Llewellyn was for years assistant manager of the Milwaukee works of the Illinois Steel Company, then vice-president of the Inland Iron & Forge Company, next secretary of the Republic Iron & Steel Company, and later vice-president of the Piano Mfg. Company. He will take his first real vacation for many years, sailing January 7 on the Deutschland for Naples, intending to pass two months in visiting Italy, France, England and Wales.

R. C. Appleby, who has been sales agent for the Solid Steel Casting Company, Chester, Pa., for the past five years, has resigned. W. H. Worrilow has been elected to succeed him.

Joseph G. Swain, secretary of the Falcon Bronze Company, Youngstown, Ohio, has resigned.

John W. Lieb, Jr., general manager of the New York Edison Company, has been made Knight Commander of the Order of the Crown of Italy in recognition of his work as an electrical engineer in Italy and of his efforts connected with the entertainment of the Italian electrical engineers last summer.

Frederick W. Bauer, late with the Cincinnati office of Rogers, Brown & Co., and previously with the Carnegie Steel Company in the same city, has accepted the position of assistant manager of the United States Engine Company, Parkersburg, W. Va.

E. S. Lea has resigned his position as sales manager for the De Laval Steam Turbine Company and has opened on office at 42 Broadway, New York, as consulting engineer. Mr. Lea prior to his four years' connection with the De Laval Company had a wide experience in the designing and constructing of power plants and water works and in the manufacture of general machinery.

By reason of a change in policy on the part of Rogers, Brown & Co. and associated interests in the Buffalo & Susquehanna and Iroquois Iron companies the position of manager of mines has been abolished, and H. B. Sturtevant, who has held that place, has resigned. The companies operated the Iroquois and Monro mines, one on the Mesaba and the other on the Menominee Range, and had opened the Susquehanna, Mesaba Range, and secured the Sauk, Baraboo district. Sauk will probably not be opened for several years. Susquehanna may be shortly opened, possibly by stripping, though the surface is 150 feet thick. Iroquois is a stripped mine, and Monro is a small milling property.

John D. Gilchrist, superintendent of mining operations for the Colorado Fuel & Iron Company, has been at Duluth, Minn., and on the Mesaba Range the past week.

L. C. Hanna, who has for the past ten years been the active head of M. A. Hanna & Co., Cleveland, Ohio, retired December 31. Mr. Hanna is a brother of the late Senator Marcus A. Hanna, and went to Cleveland from New Lisbon, Ohio, 52 years ago. He became associated 30 years ago with Rhodes & Co., which eventually became M. A. Hanna & Co. He will retain his business interest in the firm, but the active management will rest on younger shoulders.

A. Krum, formerly with Naylor & Co., Frick Building, Pittsburgh, has severed his connection with that firm and is now connected with the Standard Iron & Steel Company, New England Building, Cleveland, Ohio, dealer in iron, steel and coke.

F. H. Nullmeyer, formerly assistant superintendent of the Rankin mills of the American Steel & Wire Company, Rankin, Pa., has been made superintendent of the company's Donora mills, succeeding John E. Lonngren, resigned.

Walter S. Timmis has opened an office at 150 Nassau street, New York City, as a consulting engineer for the printing and paper trades, making a specialty of building, power plant and motor equipment.

## OBITUARY.

C. CHARLES HILL, president of the Chicago Steel Ball Company, Chicago, was fatally stricken with apoplexy while conducting experiments in his laboratory at 840 Austin avenue, December 24. Mr. Hill was 67 years old and a native of Rockford, Ill.

HARRY M. CAPP, general manager of the West End Rolling Mill Company, Lebanon, Pa., died December 30, aged 52 years. Mr. Capp spent his life in the iron business, was a son of the late Jacob Capp, one of Lebanon's early iron manufacturers, and was one of the founders of the company's chain of rolling mills. He was active in Lebanon social life and a director of the Pennsylvania Chautauqua.

JOHN P. K. OTIS, president and manager of the Union Water Meter Company, Worcester, Mass., died January 1, aged 51 years. He had been a suffered from Bright's disease for two years, and was compelled to give up business cares last spring. He was born in Worcester, March 9, 1853. After graduating from the Worcester Polytechnic Institute in 1873 he became assistant engineer of the water works at Springfield, Mass., and later was engineer of the Water Department at Portland, Me. From 1878 to 1881 he was instructor in civil engineering at the Worcester Polytechnic Institute. In 1890 he was made manager of the Union Water Meter Company and in 1900 elected president and manager. He leaves a widow and five children.

EDWARD D. G. JONES, a prominent manufacturer of paper mill machinery, died at Pittsfield, Mass., December 30, aged 80 years. He was a native of Otis, Mass. His life from early manhood was devoted to the paper machinery business at Lee and later at Pittsfield, the name of the firm being E. D. G. Jones & Co. He leaves a widow and two sons.

JOSEPH A. MILLER, a well-known patent attorney, died at Providence, R. I., December 28, aged 75 years. He was a native of Germany and graduated from Pakdam University, taking the degree of civil engineer, with a specialty of steam engineering. He practiced his profession at St. Louis until the Civil War, in which he served in the Confederate army. After the war he took up his profession in New York, then went to Providence, with the A. & W. Sprague Mfg. Company. Later he started the manufacture of a high pressure steam boiler of his own design. From 1872 until his death he practiced law as a solicitor of patents and as an expert in patent causes.

JAMES BONDE SHARPE, of Sharpe & Vance, iron and steel merchants, Chattanooga, Tenn., died of pneumonia on December 17, after an illness of only four days. He was born in Natchez, Miss., in 1864, and was the senior member of the firm.

**The Colorado Fuel & Iron Company's Iron Ore Interests.**—The company's Sunrise mine, southeastern Wyoming, is developing into an important property. A large shaft has been sunk and the mining methods changed from surface to underground. A steel shafthouse has been erected, and the underground developments carried so far as to prove the mine to be one of the very large ones, ranking well up with some of the important Mesaba mines in point of tonnage. The company is doing nothing at present in its southwestern Utah properties other than perfecting titles, and has ceased exploratory work for the time being. The ownership of the Colorado Fuel & Iron Company is now such that it is in position to secure extensions to its Utah ore fields when the time comes for their operation. It is understood that explorations in these districts have not been as encouraging as hoped for, though a large amount of good ore is known to exist there.

# The American Copper Trade.*

BY HORACE J. STEVENS, HOUGHTON, MICH.

The United States produces considerably more than half of the copper made in the entire world. Despite important developments in copper mining within the past few years in Mexico, Canada, Peru and other coutries, and the likelihood that large mines will be opened in central Southern Africa, this country is in no immediate danger of losing the unique distinction of making more than a moiety of the world's supply of a metal that ranks second only to iron in importance.

### Sounder Business Conditions in 1904.

The year just closed has witnessed a readjustment of the copper trade to sounder business conditions, and the evil situation brought about by the manipulation of prices in 1899, 1900 and 1901 has been overcome by the unhampered working of the natural laws of trade. The price of the metal is nearly 2 cents higher at the close of the year than at its opening, but the higher price is based upon the operation of natural causes and not upon the efforts of powerful producing forces to extort unwarranted prices from consumers. A continuance of high prices may be looked for during the greater part of 1905 and perhaps for a longer period. The efforts of the Secretan Syndicate in the latter 80's and of the Amalgamated Copper Company in the late 90's having failed ingloriously, it is to be hoped the market will be allowed to find and keep its natural level, prices being made, as in all other commodities, by the mutual necessities of producer and consumer.

The year 1904 has been a prosperous one in the American copper trade and ends with higher prices and better prospects than it began. The net profits of the better mines have been large, not so great as during the boom period of 1899-1901, but ample and satisfactory, and 1905 should give considerably better returns. The effect of the boom of five and six years ago is seen in the figures of production of the present year, the mines then planned being producers now.

### Sources of Supply.

For many years Lake Superior remained the only important domestic source of copper supply, but a little copper was made in Tennessee and Alabama before the Civil War, and Arizona copper was first produced, on a very small scale, in 1877, under great disadvantages. Montana became a producer in 1880 and within a few years rivaled Michigan in production, eventually becoming an even larger producer. But Michigan is steadily increasing production, while Montana has remained practically stationary for several years, due partly to litigation and partly to the fact that Butte, the sole producing camp of importance in the State, has reached its apogee as a maker of copper, and, while certain to remain a large producer for many years to come, it will be all that can be expected if the camp can open new mines rapidly enough to take the place of the older properties that are declining in production. Within the past decade California and Utah have become large copper producers, and important mining developments are under way in a number of other Western States.

The table below gives the exact figures of copper production by States for 1903 and estimates of output by States for 1904. The exact figures for the latter year will not be available for nearly or quite six months to come, hence the 1904 figures must be taken merely for what they purport to be—that is, estimates of production based upon the best information available at the close of the year and subject to revision throughout by comparison with the actual product, to be determined some months later:

| State. | Pounds avoirdupois. 1904. | 1903. |
|---|---|---|
| Montana | 267,500,000 | 272,555,854 |
| Michigan | 208,250,000 | 192,299,191 |
| Arizona | 191,000,000 | 147,648,271 |
| Utah | 52,500,000 | 38,302,602 |
| California | 22,500,000 | 17,776,756 |
| East and South | 16,500,000 | 13,855,612 |
| New Mexico | 9,000,000 | 7,300,832 |
| Colorado | 7,500,000 | 4,158,368 |
| Wyoming | 2,500,000 | 1,023,189 |
| Alaska | 2,000,000 | 1,339,590 |
| Nevada | 250,000 | 150,000 |
| Washington | 250,000 | 80,758 |
| South Dakota | 50,000 | 173,202 |
| Miscellaneous | 1,000,000 | 500,000 |
| Totals | 783,700,000 | 697,943,131 |

The foregoing figures show an increase of nearly 13 per cent. for the country as a whole. While the relative increase is the largest made for many years, the actual increase is, without exception, the largest ever secured. The figures given are more apt to overrun than to underrun the actual production, and several of the States may fail to come up to the estimates when the final reports are in, but in any case the increased production of copper in the United States is the greatest ever made in a single year. The largest actual increase is that of Arizona, with a gain of more than 43,000,000 pounds, a 30 per cent. increase. Michigan has gained 16,000,000 pounds, about 8 per cent., and Utah shows the largest proportionate gain, 38 per cent., with an increase of about 14,000,000 pounds.

The following table gives the actual production for 1903 and estimated output for 1904 of the 25 largest copper mines of the United States, and, like the preceding table, the 1904 figures are to be taken as close estimates only, based upon data available at the close of the year:

| Mine. | Pounds. 1904. | 1903. |
|---|---|---|
| Boston & Montana | 100,000,000 | 90,750,000 |
| Anaconda | 85,000,000 | 93,500,000 |
| Calumet & Hecla | 77,500,000 | 76,490,869 |
| Copper Queen | 50,000,000 | 36,885,000 |
| United Copper Company | 33,000,000 | 30,000,000 |
| United Verde | 33,000,000 | 25,000,000 |
| Calumet & Arizona | 31,000,000 | 25,535,857 |
| Arizona Copper Company | 24,750,000 | 30,821,842 |
| Osceola | 21,250,000 | 16,059,636 |
| Mountain | 20,000,000 | 13,189,714 |
| Quincy | 18,000,000 | 18,498,288 |
| Old Dominion | 17,000,000 | 8,575,776 |
| Detroit | 16,000,000 | 16,558,232 |
| Tamarack | 15,250,000 | 15,286,093 |
| Utah Consolidated | 15,000,000 | 11,840,431 |
| Bingham | 13,500,000 | 9,000,000 |
| Butte Reduction Works | 13,000,000 | 15,250,000 |
| Champion | 12,500,000 | 10,564,147 |
| Butte & Boston | 12,000,000 | 15,000,000 |
| Parrot | 12,000,000 | 14,000,000 |
| Tennessee | 12,000,000 | 10,690,389 |
| Baltic | 11,750,000 | 10,580,997 |
| Shannon | 11,500,000 | 6,250,000 |
| United States | 11,000,000 | 9,000,000 |
| Washoe | 10,000,000 | 8,000,000 |

### Features of Individual Mines.

Several notable features are presented in the foregoing table, one being the supremacy of the Boston & Montana among American mines, or, for that matter, among the copper mines of the world, which it now heads in production. Anaconda has gone a little further down grade during the year, and its output of 85,000,000 pounds of blister copper, while being second in the world to Boston & Montana only, is a great shrinkage from its high water mark of 131,000,000 pounds made in 1897. Anaconda is mining more ore than ever before in its history, but the average grade is low, with a marked tendency toward further decrease, and but for the advantage of the magnificent Washoe reduction plant, incomparably the largest in the world, the Anaconda would be out of the race both as a large producer and as a money maker. As matters now stand, the Anaconda will remain one of the world's largest producers for a long time to come, and, by virtue of a magnificent equipment and good management—for the mines of the Amalgamated do have good management—the Anaconda should pay considerable dividends in the future, but its best days are past.

Boston & Montana now holds the lead for the world, and probably will keep it for several years to come, but there are possible rivals who may give it a brush for first place during the next few years, among these being the Greene Consolidated of Mexico and the Rio Tinto of Spain, while in the United States the Calumet & Hecla will be a strong competitor for honors after its mills are rebuilt, and the Copper Queen of Arizona would be in a

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position if it had the smelting facilities to make a sharp race.

Owing to its conservative management, the fact that its shares are not listed on any exchange, and the quiet with which its management attends strictly to its own business, the magnitude of the Copper Queen and its possibilities for the future are almost unknown except to its owners and the comparatively few copper men acquainted with the property. The Copper Queen is in several important respects the best copper mine in the United States at present and will bear watching for the future.

In addition to the four properties already enumerated as possible future competitors of the Boston & Montana for first place the Calumet & Arizona group must be considered. At present this group consists of one producing mine—the Calumet & Arizona—and four developing properties. Should these be consolidated in a single company, as is possible, there is little question that it will head the list of the world's producers within five years. As it is the Calumet & Arizona has made upward of 30,000,000 pounds of copper during the year from a single shaft, and will put its second shaft in commission in 1905, and, with the added smelting facilities now planned, can turn out 4,000,000 to 5,000,000 pounds of copper monthly thereafter. Within two or three years two of the developing mines of the Calumet & Arizona group will become large producers, and the copper world will learn with surprise that other new mines as big as the Calumet & Arizona, and also capable of making 25,000,000 pounds of metal in their first year, are to be added to the list of the world's largest copper producers.

The Osceola has made the greatest gain of any Lake Superior mine during the year and now stands ninth among American producers. The Baltic and Champion mines also have gained a few points in position, but the other large lakes mines show comparatively small changes in production. The United Verde has made a better product than during the preceding year, but the Arizona Copper Company has fallen off in production. The Old Dominion of Arizona has made the largest relative gain of any large American mine, having doubled its output during the year under the capable management of Phelps, Dodge & Co., and will show a large gain in production for 1905 as well. The Shannon, another Arizona property, also has done very well during 1904.

All three of the big Utah mines have increased production, and a number of smaller but promising producers have entered the field. The Tennessee has increased its output during the year, but not so largely as was anticipated.

### American Copper Growth.

The growth of the American copper industry is well illustrated by the following table, giving production for every fifth year since 1849, the date of the first dividend payment by a Lake Superior mine, the past five years, with estimates of 1904 production, being given in detail:

| Year. | Long tons. | Year. | Long tons. |
|---|---|---|---|
| 1849 | 700 | 1889 | 101,239 |
| 1854 | 2,250 | 1894 | 158,120 |
| 1859 | 6,300 | 1899 | 253,870 |
| 1864 | 8,000 | 1900 | 269,111 |
| 1869 | 12,500 | 1901 | 268,522 |
| 1874 | 17,500 | 1902 | 294,297 |
| 1879 | 23,000 | 1903 | 311,536 |
| 1884 | 64,708 | 1904 | 349,866 |

Less than a quarter century ago Chile was a larger producer of copper than the United States, and both were behind Spain, then the leading copper producing country of the globe. Now this country is far in the lead of both. The 1904 production of the United States was more than ten times that of Chile and almost exactly seven times that of Spain. The 1904 copper production of the United States was greater than the entire copper product of the world at so comparatively recent a date as 1895—only nine years ago.

The following table gives the percentage of the total American product furnished by the three leading states for the past half century at five-year periods, with the past five years given in full:

| Year. | Michigan. | Montana. | Arizona. | Year. | Michigan. | Montana. | Arizona. |
|---|---|---|---|---|---|---|---|
| 1854 | 81 | .. | .. | 1894 | 32 | 52 | 13 |
| 1859 | 63 | .. | .. | 1899 | 26 | 40 | 23 |
| 1864 | 69 | .. | .. | 1900 | 24 | 45 | 20 |
| 1869 | 95 | .. | .. | 1901 | 26 | 38 | 22 |
| 1874 | 87 | .. | .. | 1902 | 26 | 44 | 18 |
| 1879 | 83 | .. | .. | 1903 | 27 | 39 | 21 |
| 1884 | 47 | 30 | 18 | 1904 | 27 | 34 | 25 |
| 1889 | 38 | 43 | 13 | | | | |

The most noticeable feature of the preceding table is the gain scored by Arizona, which is now crowding Michigan for second place and is liable to take it in 1905, but is almost certain to occupy second place in 1906, with a prospect of closely crowding Montana a year or two later. There is every prospect that Arizona will head all the American States as a producer before the close of the present decade. The table shows that Lake Superior has just about held its own in the proportionate increase of the entire country during the past six years, while Montana has made a small actual increase in output but has lost relatively, dropping from 40 per cent. in 1899 to 34 per cent. in 1904. Utah, which does not appear in the foregoing table, made more than 6 per cent. of the total American production in 1904.

### Our Foreign Trade.

The table below gives American imports and exports for the past 10 years, estimating 1904. The exports will vary but little from the estimate, but the imports may show a greater deviation from the figures given, though they will serve as a fair approximation of the actual figures. The matter of arriving at the quantity of fine copper contained in imports is a somewhat difficult one, as the imports are in many varying forms, ranging from crude ore of all grades, brought across the border from Canada for smelting, through matte from Mexico and other countries brought in for conversion, up to blister copper imported from many foreign countries for refining, and ending with commercial copper in different forms, both new and old:

| Year. | Exports. Pounds. | Imports. Pounds. | Excess of exports. Pounds. |
|---|---|---|---|
| 1895 | 136,528,390 | 14,616,223 | 121,912,167 |
| 1896 | 282,105,860 | 17,297,272 | 264,808,588 |
| 1897 | 288,662,340 | 28,578,420 | 260,083,920 |
| 1898 | 321,023,873 | 73,916,467 | 247,107,406 |
| 1899 | 252,876,480 | 95,722,340 | 277,154,140 |
| 1900 | 348,402,853 | 105,176,808 | 243,226,045 |
| 1901 | 222,137,911 | 137,826,407 | 84,311,505 |
| 1902 | 354,668,849 | 194,501,757 | 160,167,092 |
| 1903 | 310,729,524 | 168,707,995 | 142,021,529 |
| 1904 | 550,000,000 | 175,000,000 | 375,000,000 |

The increase in imports of more than tenfold within a decade is due partially to the bringing in of low grade ores from Canada for smelting in furnaces near the boundary and the refining of Canadian nickel copper in American plants, and also to the importation of blister copper from Australasia and other points for refining here, but the greatest increase is caused by the importation of matte and blister copper from Mexican mines. The entire production of the Greene Consolidated and of other important new producers in Mexico reaches the United States.

It is evident that the real story of American exports is told in the final column, which shows the excess of exports over imports, and a study of this column tells a plain tale of the history of the American export trade in copper during the past decade. The business was upon a steady and healthy basis from 1896 until 1899, inclusive. American consumption was increasing, owing to business recovery from the panic years following 1893, and our surplus was cared for by the foreign demand at fair prices. In 1900 the continued high price of the metal, warranted during the preceding year but not in 1900, caused a falling off in exports. In 1901, it having become apparent that the price was rigged and must break sooner or later, foreign customers bought no copper from the United States that could be secured elsewhere or done without, and the surplus metal was stored here.

The break in price late in 1901 was reflected by doubled net exportations during the following year, but the immense domestic demand, stimulated by low price, absorbed the surplus in an unexpectedly rapid manner and practically wiped it out during 1903. The past year has been marked by a sharp falling off in domestic demand on account of the general curtailment in the manufacture of machinery, which still takes materially more

copper than the electrical trades, but what might have proved an embarrassing situation to the trade, inasmuch as American production increased by nearly 13 per cent. in the face of decreased demand, was saved by the strong foreign demand. The foreign market for copper has been excellent, owing to the great improvement of business in Germany and the necessity all foreign manufacturers were under of increasing their stores, which had been allowed to reach very low proportions.

The year closes with a strong foreign demand and a greatly increased domestic consumption, due to the general revival of business in the United States. Prices have advanced nearly two cents during the last quarter of 1904, and the metal closes the year firm at about 15 cents per pound. It would be unreasonable to expect a continuance of the heavy foreign demand during 1905 with copper at 15 cents or more, but the domestic trade will make up for the falling off in exports quite certain to come during 1905. The copper situation is very good in all particulars, but there seems neither reason nor necessity for a higher price than 15 cents, and while the demand may keep prices at the present level for some time, and may even cause an advance, it seems reasonable to look for a recession to perhaps about 14 cents not later than the middle of 1905, and perhaps at a much earlier date. There is an ample margin of profit in the business at 14 cents for all of the good mines, and the trade will end the year in healthier condition if the average market price of the metal shall be 14 rather than 16 cents during 1905.

## NEWS OF THE WORKS.

### Iron and Steel.

The La Belle Iron Works, Steubenville, Ohio, recently placed a contract with the Weimer Machine Works Company, Lebanon, Pa., for one of its latest style automatic dump cinder cars, double connected truck type. The purchase of these cinder cars was brought about by the starting of No. 2 blast furnace of the La Belle Iron Works, which went in blast last month.

The Sharon Steel Hoop Company, Sharon, Pa., manufacturer of billets, sheet and tin bars, hoops, bands and cotton ties, has let contracts for the erection of a 10-inch mill. The steel buildings will be erected by the McClintic-Marshall Construction Company, Pittsburgh; the engines will be furnished by the Wm. Tod Company, Youngstown, Ohio, while the mills and furnaces will be built by the Morgan Engineering Company, Alliance, Ohio, and the United Engineering Foundry Company, Pittsburgh. This mill is expected to be completed about June 1, and will cost about $200,000.

The E. & G. Brooke Iron Company has commenced repairs to its No. 2 furnace, at Birdsboro, Pa. The stack will be made ready for blast as soon as needed.

The remaining five mills in the South Sharon works of the American Sheet & Tin Plate Company, at South Sharon, Pa., were started last week, making the entire 20 mills in this plant in full operation.

In one day recently there were turned out in the open hearth plant of the Carnegie Steel Company, at South Sharon, Pa., 1410 tons of open hearth billets, exceeding the best previous record of 1400 tons in one day.

The Carnegie Steel Company has made a readjustment in wages of employees at the Howard axle works, at West Homestead, Pa. Some of the skilled men who received the highest wages have been reduced about 16 2-3 per cent., and others who are not so well paid about 5 per cent.

The Globe Rolling Mill Company, Cincinnati, Ohio, which has been operating several branch plants, at Winton Junction and on Second street, that city, has leased more commodious quarters at Front and Smith streets, where it will consolidate all of the interests under one roof. The new plant when finished will be 248 feet on Front street and 175 feet on Smith street. The company will spend several thousand dollars in remodeling the present building now occupying the site, and will move all of the present equipment to the new location. The few additional tools and machinery required have already been secured.

The Coke furnaces at Embreeville, Tenn., after having been remodeled and enlarged, will be put into blast early in January. Its product will be foundry and malleable Bessemer pig iron. Pickands, Brown & Co., The Rookery, Chicago, are sole agents.

### General Machinery.

The Norwood Engineering Company, Florence, Mass., manufacturer of hydrants, filters, paper finishing machinery, &c., has abandoned the idea of leaving Florence and building a new plant elsewhere. Arrangements have been made for acquiring the necessary land in Florence, and new building, which is necessary because of the increase in the business, will be done in that town.

The Cutler-Hammer Mfg. Company, Milwaukee, Wis., has increased its capital stock from $500,000 to $1,000,000. Part of the additional capital will be used in equipping the new plant which the company is just completing. The product consists of rheostats, electrical elevators and electrical supplies generally.

The Connellsville Mfg. & Mine Supply Company, Connellsville, Pa., has decided to expend about $50,000 in making improvements to equipment and additions to its shops at New Haven, Pa. These improvements will consist of a new construction house where the mine fans and other machinery are made, and a three-story steel and concrete storage house for patterns. A steel extension for the electric crane will run 80 feet to the north of the foundry, and 150 feet south of the new machine shop for the crane located there.

The W. G. Taft Machine Company has opened a new repair shop at Willimantic, Conn. The company makes light tools and does repair work.

The Scranton works of the American Locomotive Company will build 35 new engines for the Delaware & Hudson Canal Company.

The Reading Railway's shops at Reading, Pa., have been working at full time of late, owing to the rush of repair work. December was one of the busiest months of 1904, and more locomotives were repaired than for a long time. The Pennsylvania Railroad Company's Altoona, Pa., shops have also been working full time because of necessary repairs to motive power and rolling stock.

Dwight, Divine & Son, Ellenville, N. Y., manufacturers of pocket cutlery, will soon be in the market for two shapers.

The Watson-Stillman Company, New York, manufacturer of hydraulic machinery, which recently moved its plant to Aldine, N. J., has incorporated with a capital stock of $100,000.

### Power Plant Equipment.

The Department of the Interior, Washington, will receive bids until January 24 for the construction of extensions to the water, sewer and electric lighting systems at the River Side School, California, and will also receive bids until January 28 for the construction of a water system at the Phœnix school, Arizona.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until January 24 for the installation of an electric lighting system in the barracks of the United States navy training station, at Newport, R. I.

Engineer C. C. Wilson of Columbia, S. C., will receive bids until February 15 for the construction of an electric light plant for Clinton. The estimated cost is $25,000.

The California Gas & Electric Corporation, San Francisco, has just ordered from the Stanley Electric Mfg. Company, Pittsfield, Mass., two large frequency changing outfits of 5000 kw. capacity each, amounting to virtually 20,000 kw. capacity, divided between four machines operated as two motor generator sets. These outfits are for use in connection with the contract which the California Gas & Electric Corporation has secured from the San Francisco Street Railway Company, and will change the 60-cycle current from the Bay County long distance line to 25 cycles for further distribution among the substations of the street railway company. The contract awarded the Stanley Company also includes transformers of 12,000 kw.

The Utah Light & Railway Company, Salt Lake City, Utah, has just completed the construction of a brick, steel and concrete transformer house, 45 x 100 feet and 30 feet high. It is built to receive power from six high tension lines at 40,000 and 28,000 volts and to have a transformer capacity of 10,000 kw. This transformer house is to be used for receiving all the power used in Salt Lake City, which is transmitted from the various water power plants operated by the company.

The Ada Electric & Gas Company has been incorporated to furnish heat, light and power and to manufacture ice. The company is incorporated for $100,000 and is located at Belleville, Ill. Those interested in it are J. A. Hamilton, A. H. Daab and L. D. Turner, Jr.

The Massachusetts Electric Companies, Boston, Mass., will make important improvements in its power stations in the neighborhood of Salem and Cape Ann the coming season, according to the annual report just issued.

The Westinghouse Electric & Mfg. Company, Pittsburgh, received an order last week from Japan for equipment for an electric railway power house at Hokaida, Japan. The company has received a contract for the electrical equipment to be used by the Panama Railway Company, while last week it shipped to Buenos Ayres, South America, 20 electric motors to be used to replace machinery operated by steam. Several large electric motors were shipped last week to Chile.

Sealed proposals will be received by the Board of Public Works, Kansas City, Mo., until January 14, for the construction, delivery and erection of a self contained, vertical, triple expansion crank and fly wheel pumping engine of 20,000,000 gallons capacity against a combined lift of 340 feet for ordinary purposes and 410 feet for fire purposes, with a steam pressure of 150 pounds per square inch. Everett Elliott is secretary of the board.

Carson, Pirie, Scott & Co., dry goods merchants, are taking figures on an independent electric lighting and power station to be installed in the basement of their new building at State and Madison streets, Chicago. The company has just closed a deal with Otto Young by which the latter will erect for it a 12-story steel building, 104 x 144 feet, adjoining the present store. The building will cost $800,000.

C. W. Carman, Railway Exchange Building, Chicago, is taking figures on a 12 x 13 inch, 275 revolutions per minute engine and a direct connected multipolar type generator for the Addressograph Company's new plant.

The Chicago University is asking for estimates on 2000 horse-power water tube boilers, which are required for the enlargement of the present central heating and power plant on the University campus. Bion J. Arnold, Marquette Building, is engineer in charge of this improvement.

The Farr Alpaca Company, Holyoke, Mass., has contracted with the General Electric Company for a 1000-kw. generator and steam turbine direct connected. A new power house will be erected and new boilers installed to provide the necessary additional steam power. This action of the company is due to the recent state of low water in the Connecticut River.

### Foundries.

The Thomas D. West Foundry Company has been incorporated at Sharpsville, Pa., with a capital of $50,000. The incorporators are George H. Boyd, I. W. Boyd and Thomas D. West. This concern operates a large foundry at Sharpsville, the principal output of which is ingot molds.

The Diamond Foundry Company, Binghamton, N. Y., started in operation about December 15, making a line of brass and iron castings of all descriptions. It occupies the old plant of the Adams Foundry. Fred. Etapene of Gaylord & Etapene is the financial backer of the company, with James Green acting as superintendent.

The National Steel Foundry Company, New Haven, Conn., has been awarded the contract for the steel castings that will enter into the cars of the London Underground Railway, the contract for which is held by the American Car & Foundry Company.

The Crompton & Knowles Loom Works, Worcester, Mass., are to erect a new foundry at their Philadelphia works. The building will be about 60 x 90 feet, with a basement story for the storage of flasks, &c., and with a head house 30 x 45 feet.

Forty molders of the Trenton Malleable Iron Company's plant, Trenton, N. J., struck December 30 because one of the employees was a nonunion man. The strike is said to be part of a general plan of iron molders throughout the country to fight the growing movement for the open shop.

### Bridges and Buildings.

Fred. Mateer and Chas. B. Mateer, respectively general contracting agent and mechanical engineer for the Joliet Bridge & Iron Company, have with their brothers, Don L. Mateer and Frank W. Mateer, incorporated the Joliet Steel Construction Company, with a capital stock of $25,000. This company started in business January 1 at Joliet for contracting and constructing steel bridges and buildings and similar structural work.

The Kenwood Bridge Company, Chicago, reports that it is just finishing up at Mitchell, Ill., a steel viaduct about 1500 feet long, including one 166 and one 104 foot span over the tracks of the Wabash and Alton railroads. The material for this viaduct aggregates about 500 tons. The company is also erecting a hotel at Cedar Rapids, Iowa, in which is involved about 400 tons of steel. It has also just completed a large steel coal bunker for the Merchants Heat & Light Company at Indianapolis, Ind. The capacity of the Kenwood Bridge Company has been considerably increased by the installation of a new beam shear and coping tool and a gate shear, and the entire plant equipped with electricity, with separate motors for each tool.

### Fires.

The factory of William T. Wood & Co., Arlington, Mass., was damaged by fire December 28. The forging department was the chief sufferer, the loss to its building and machinery being $15,000.

One of the foundries of the American Car & Foundry Company at Berwick, Pa., was destroyed on December 31. The foundry will be rebuilt.

The repair barns of the Chicago Union Traction Company, Chicago, Ill., were destroyed by fire December 31. The loss is placed at $150,000.

A fire on December 31 did $150,000 damage to the plants of the Cunningham Milling Company and the Little Rock Furniture Mfg. Company at Little Rock, Ark.

### Hardware.

The Lippert Saw Mfg. Company has been organized with a capital of $100,000 and will erect a plant at Scottdale, Pa., for the manufacture of saws and finished steel products of the smaller variety. The new concern has taken over the Penn Saw Works, located for 20 years at Millvale, Pittsburgh, and this plant will be moved from Millvale to Scottdale.

The L. & I. J. White Company, Buffalo, N. Y., advises us that its export trade in all lines of machine knives and edge tools is constantly growing. The company has recently established sales agencies in Chile, Peru, Ecuador and British Guiana in South America, also in the West Indies and Porto Rico. Its trade in machine knives with Germany and other European countries is steadily expanding, which is also the case with South Africa and Australia.

The Hart & Cooley Company, New Britain, Conn., manufacturer of wrought steel hot air registers, is building a large addition to its present factory, so that the company may be in a position to take care of the large demand which is confidently expected.

Iver Johnson's Arms & Cycle Works, Fitchburg, Mass., reports that its revolver and single gun business during the past year was the largest in the history of the concern. During the last half of the year some of the departments were operated day and night, six days a week.

### Miscellaneous.

The Essex Glue & Gelatine Company has begun the erection of a large plant at Salem, Mass., on the site of the Brown Glue Works, which were destroyed by fire a year ago. There will be five main buildings in the new plant, equipped with modern machinery.

The C. T. McCue Company has been incorporated under Connecticut laws, with capital stock of $50,000, to deal in and assemble gears for vehicles of all kinds. Business will begin in the buildings of the Hartford Woven Wire Mattress Company, Hartford, Conn., where large space has been leased. The officers are C. T. McCue, F. C. Billings of the Billings & Spencer Company, and Herbert A. Wiley of Boston. It is not the plan to do much actual manufacturing at first. The parts will be bought and assembled.

The Impervious Product Company, Baltimore, Md., has enlarged its refinery and works at Fairfield, installing the latest improved processes and appliances for turning out asphalt and coal tar products. The plant is conveniently located on the Patapsco River and the Baltimore & Ohio and Pennsylvania railroads.

Paul S. Reeves & Son, Philadelphia, Pa., have about completed an order for the United States Government for six propeller blades and two hubs made of special Tubal bronze, for the battle ship Vermont, building at the yards of the Fore River Shipbuilding Company, Fore River, Mass. These propeller blades are each 8 feet in height and 6 feet in extreme breadth and weigh 7500 pounds each. The hubs are 5 feet in extreme diameter and weigh 11,000 pounds each. Physical tests of the metal showed ultimate strength, 72,000 pounds; elastic limit, 31,590 pounds; elongation, 29 per cent., exceeding the required specifications. These are the largest castings of the kind that Reeves & Son have made. In addition to the above they have recently completed castings of Tubal bronze on which compression tests showing reduction of 0.118 inch, with a load of 100,000 pounds per square inch, and the elastic limit at 300,000 pounds were made, while water pressure tests of the same metal have been satisfactorily made up to 2000 pounds per square inch.

The Textile Mfg. Company, Westfield, Mass., will rebuild the structure recently destroyed by fire, and the new building will be occupied by the Bryant Box Company, which was burned out in the fire.

The large plant of the Pressed Steel Car Company, in lower Allegheny, Pa., which has been idle more or less for the past year, was put in full operation this week, giving employment to about 1500 men. The Pressed Steel Car Company has recently booked some very large orders for steel cars, and is now operating its McKee's Rocks and Allegheny plants to full capacity.

The plant of the Blandford Brick & Tile Company, Russell, Mass., has been taken by S. G. Otis, who will equip it for the manufacture of fiber goods, an imitation of leather. It is planned to develop the water power of the Westfield River to operate the establishment.

The plant of the United States Watch Company, Waltham, Mass., has become the property of the E. Howard Watch & Clock Company. It is understood that the factory will continue to be operated in the manufacture of watches.

The general contract for erecting the great plant of Sears, Roebuck & Co., Chicago, has been let to the Thompson Starrett Company. Adams & Schwab, Railway Exchange Building, Chicago, have charge of the engineering features.

It is probable that Schwarzschild & Sulzberger will build a $1,000,000 packing plant at Sioux City, Iowa. At the headquarters of the firm in New York the officers refused to either confirm or deny the reports.

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**The Pressed Steel Car Company has won its suit in the blue prints case against the Standard Steel Car Company. The Supreme Court says there are no grounds on which the latter can claim ownership to the blue prints or the right to use them in manufacturing or selling cars.**

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**Millard Hunsiker, the London representative of the United States Steel Corporation, is in St. Petersburg.**

# The Iron and Metal Trades

Interest centers in the Steel Rail trade, in which there is a shade of disappointment from the standpoint of the mills. The railroads have not come forward quite as liberally with their orders as was expected, intimating some dissatisfaction with the reaffirming of the 1904 price for 1905. During the past week the Vanderbilt lines placed a total tonnage of 90,000 tons, which is below the estimates and will probably be added to later on. The Cincinnati, Hamilton & Dayton road has ordered 10,000 tons, which may be increased to 15,000 tons. The Reading system has placed about 15,000 tons. It turns out that the requirements of the Southern Railway were very much larger than was thought at first. The total amount placed was about 120,000 tons, of which the Tennessee Company was allotted 66,000 tons. The latter concern took 15,000 tons for another road two weeks since, and with the older Louisville & Nashville and Gould system orders is filled up for practically the whole of the current year.

It is worthy of note that leading sellers of Light Rails now ask $25 for the first half of this year and $27 for the second six months.

The continued buying of the railroads is observed in rolling stock. Some large orders for Steel cars have been given out and negotiations for additional lots are pending. This has led to greater activity for the Plate and Structural mills.

What may be a very large transaction is the contract for the bridge work for the Harriman lines. This calls for a minimum of 15,000 tons, but it may be expanded to a maximum of 25,000 to 30,000 tons, the work going to the American Bridge Company. Some good work is coming up in other quarters. Our Chicago correspondent estimates that structures in the dry goods district in that city will require about 25,000 tons. It is noted, however, that sharp competition has again developed on fabrication of structural material, and that the bridge shops are quoting prices which seem inexplicable in view of the official figures for the Shapes made by the rolling mills.

There has been a good deal of activity in the Pipe trade, which is reflected in the Skelp market. The mills, under the leadership of the National Tube Company, have advanced prices on Merchant Pipe by lowering discounts half a point, and have promulgated a readjustment of discounts on Boiler Tubes.

There has been little doing in Pig Iron. Buffalo makers, who have been heavy sellers lately, that being the cheapest market, have advanced prices to and somewhat beyond the parity of other districts. The furnaces connected with the Steel works have during the holidays accumulated a little Iron, the furnaces remaining in operation while the Steel plants were idle.

The European Steel makers, and notably the Germans, have again advanced prices on Steel, while the rolling mills are asking higher prices on Shapes and Bars.

## A Comparison of Prices.

**Advances Over the Previous Month in Heavy Type, Declines in Italics.**

At date, one week, one month and one year previous.

| | Jan. 4, 1905. | Dec. 28, 1904. | Dec. 7, 1904. | Jan. 6, 1904. |
|---|---|---|---|---|
| **PIG IRON:** | | | | |
| Foundry Pig No. 2, Standard. Philadelphia | **$17.50** | $17.25 | $16.50 | $14.75 |
| Foundry Pig No. 2, Southern, Cincinnati | **16.25** | 16.25 | 15.75 | 12.00 |
| Foundry Pig No. 2, Local, Chicago | **17.50** | 17.00 | 16.50 | 14.50 |
| Bessemer Pig, Pittsburgh | **16.85** | 16.85 | 16.35 | 14.10 |
| Gray Forge, Pittsburgh | 15.85 | 15.85 | 15.85 | 13.00 |
| Lake Superior Charcoal, Chicago | **18.50** | 18.50 | 17.85 | 16.75 |
| **BILLETS, RAILS, &c.:** | | | | |
| Steel Billets, Pittsburgh | **22.00** | 22.00 | 21.00 | 23.00 |
| Steel Billets, Philadelphia | 25.00 | 25.00 | 25.00 | 24.25 |
| Steel Billets, Chicago | **25.00** | 25.00 | 24.00 | 24.00 |
| Wire Rods, Pittsburgh | 31.00 | 30.00 | 31.00 | 30.00 |
| Steel Rails, Heavy, Eastern Mill | 28.00 | 28.00 | 28.00 | 28.00 |
| **OLD MATERIAL:** | | | | |
| O. Steel Rails, Chicago | **16.00** | 16.00 | 14.50 | 9.00 |
| O. Steel Rails, Philadelphia | **17.25** | 17.00 | 16.50 | 11.50 |
| O. Iron Rails, Chicago | **22.25** | 22.25 | 22.00 | 13.00 |
| O. Iron Rails, Philadelphia | 20.50 | 20.00 | 20.50 | 16.00 |
| O. Car Wheels, Chicago | **16.75** | 16.75 | 16.00 | 13.00 |
| O. Car Wheels, Philadelphia | **15.25** | 15.00 | 14.50 | 12.75 |
| Heavy Steel Scrap, Pittsburgh | **16.50** | 16.50 | 16.00 | 11.00 |
| Heavy Steel Scrap, Chicago | **15.00** | 15.00 | 14.00 | 10.00 |
| **FINISHED IRON AND STEEL:** | | | | |
| Refined Iron Bars, Philadelphia | **1.63½** | 1.63½ | 1.53½ | 1.35 |
| Common Iron Bars, Chicago | 1.65 | 1.65 | 1.65 | 1.30 |
| Common Iron Bars, Pittsburgh | **1.69¾** | 1.69¾ | 1.54½ | 1.34¾ |
| Steel Bars, Tidewater | **1.54½** | 1.54½ | 1.44½ | 1.44½ |
| Steel Bars, Pittsburgh | **1.40** | 1.40 | 1.30 | 1.30 |
| Tank Plates, Tidewater | **1.64½** | 1.64½ | 1.54½ | 1.74½ |
| Tank Plates, Pittsburgh | **1.50** | 1.50 | 1.40 | 1.60 |
| Beams, Tidewater | **1.64½** | 1.64½ | 1.54½ | 1.74½ |
| Beams, Pittsburgh | **1.50** | 1.50 | 1.40 | 1.60 |
| Angles, Tidewater | **1.64½** | 1.64½ | 1.54½ | 1.74½ |
| Angles, Pittsburgh | **1.50** | 1.50 | 1.40 | 1.60 |
| Skelp, Grooved Steel, Pittsburgh | **1.45** | 1.45 | 1.40 | 1.50 |
| Skelp, Sheared Steel, Pittsburgh | 1.50 | 1.50 | 1.50 | 1.50 |
| Sheets, No. 27, Pittsburgh | **2.20** | 2.20 | 2.10 | 2.25 |
| Barb Wire, Pittsburgh | **2.20** | 2.20 | 2.15 | 2.45 |
| Wire Nails, Pittsburgh | **1.75** | 1.75 | 1.70 | 1.85 |
| Cut Nails, Pittsburgh | **1.75** | 1.75 | 1.70 | 1.90 |
| **METALS:** | | | | |
| Copper, New York | **15.12½** | 14.87½ | 14.87½ | 12.37½ |
| Spelter, St. Louis | **6.00** | 5.85 | 5.70 | 4.75 |
| Lead, New York | 4.60 | 4.60 | 4.60 | 4.25 |
| Lead, St. Louis | 4.52½ | 4.55 | 4.52½ | 4.17½ |
| Tin, New York | *29.05* | 29.35 | 29.12½ | 28.60 |
| Antimony, Hallett, New York | *8.75* | 8.75 | 9.00 | 6.25 |
| Nickel, New York | 40.00 | 40.00 | 40.00 | 40.00 |
| Tin Plate, Domestic, Bessemer, 100 pounds, New York | **3.74** | 3.74 | 3.64 | 3.79 |

## Chicago.

FISHER BUILDING, January 4, 1905.—(*By Telegraph.*)

The Iron and Steel trade is resting after the labors of an inventory and the diversion of a double holiday, but there is no sign of weakness in the comparative inactivity of the opening days of the year. The month of December broke all records for at least one large producer of Bars. More than 300,000 tons of Rails and Splices have already been booked by Western mills. Pig Iron furnaces are systematically cutting down the tonnages that they will condescend to give buyers, being generous if they give the buyer half the tonnage he asks the privilege of placing, and in most cases offering only one-fourth the amount. Northern Iron was advanced last Wednesday morning to a minimum of $17.50, or 50c. above previous quotations. Bar, Plate and Structural mills have, on an average, already booked orders that will call for their maximum tonnage for 90 days. Even Sheet producers are wary of taking on much tonnage at present figures. Pipe has been advanced $1 a ton. Billets are officially unchanged, but actually $1 above pool price for Bessemer and at $2 to $4 premium for Open Hearth Forging quality. There is plenty of Coke in this market, notwithstanding the usual car shortage scare, but prices are firm. The sentiment now prevails in this market that 1905 will break all previous tonnage records and that business will be done at a profit throughout the year.

**Pig Iron.**—Owing to the crippled condition of the telegraph service between Chicago and New York last Wednesday a late bulletin sent to *The Iron Age* from here announcing an advance of 50c. a ton on Northern Iron arrived too late for publication. The new basis for Northern Iron is $17.50 for No. 2, the other Iron prices remaining unchanged.

Business is rather quiet, but the situation is strong. We quote:

| | |
|---|---|
| Lake Superior Charcoal | $18.50 to $19.00 |
| Northern Coke Foundry, No. 1 | .... to 18.00 |
| Northern Coke Foundry, No. 2 | .... to 17.50 |
| Northern Coke Foundry, No. 3 | .... to 17.00 |
| Northern Scotch, No. 1 | 18.00 to 18.50 |
| Ohio Strong Softeners, No. 1 | 19.30 to 19.80 |
| Ohio Strong Softeners, No. 2 | 18.80 to 19.30 |
| Southern Silvery, 4 to 6 per cent. Silicon | 18.65 to 19.65 |
| Southern Coke, No. 1 | .... to 17.65 |
| Southern Coke, No. 2 | .... to 17.15 |
| Southern Coke, No. 3 | .... to 16.65 |
| Southern Coke, No. 4 | .... to 16.40 |
| Southern Coke, No. 1 Soft | .... to 17.65 |
| Southern Coke, No. 2 Soft | .... to 17.15 |
| Southern Gray Forge | .... to 16.50 |
| Southern Mottled and White | .... to 15.90 |
| Malleable Bessemer | .... to 17.50 |
| Standard Bessemer | 18.50 to 19.00 |
| Jackson County and Kentucky Silvery, 6 to 8 per cent. Silicon | 21.30 to 22.30 |
| Jackson County and Kentucky Silvery, 10 per cent. Silicon | .... to 23.30 |
| Alabama Basic | .... to 17.15 |
| Virginia Basic | .... to 17.15 |

**Billets.**—Inasmuch as all Billet producers are a unit in asking a minimum of $25, Chicago, for Bessemer Billets we ignore the so-called official price and quote this as the actual price for Billets 16 square inches in section and larger up to but not including 100 square inches, and $27 for Bessemer Billets larger than 100 square inches in section. Open Hearth Forging Billets are held by all producers at from $28 to $32 a ton, in spite of the fact that the official price of $26 is nominally in force. Sheet and Tin Plate Bars are still held at premiums ranging from $1 to $3 a ton above official Billet pool price.

**Rails and Track Supplies.**—The leading Western mill has booked over 250,000 tons of Steel Rails for shipment in 1905 already besides a correspondingly large tonnage of Light Rails, Fish Plates, Spikes and Track Bolts, &c.; in fact, it is estimated that enough tonnage in these lines has already been booked to keep the Western mills running to their full capacity for the first six months of the year. Prices are firm on the following basis: Standard Section Rails, $28 per gross ton, at mill, in 500-ton lots or greater, plus full freight to destination; Light Rails from $24 to $30, according to weight, in car lots, at mill; Angle Bars, 1.35c. to 1.40c., f.o.b. mill; Spikes, 1.70c. to 1.75c.; Track Bolts, 2.30c. to 2.45c. Store prices on Track Supplies range from 15c. to 20c. per 100 lbs. above mill prices.

**Structural Materials.**—Contract for about 3000 tons of Structural Steel for a new store for Mandel Brothers will be placed in a day or two. Other State street structures will be in the market very shortly, the Structural Steel required for immediate improvements in dry goods buildings on State street and Wabash avenue aggregating more than 25,000 tons. Actual business in the opening days of 1905 is light, but the tone is strong, the mills already being booked up two to three months ahead. We quote: Beams and Channels, 3 to 15 inches, inclusive, 1.66½c.; Angles, 3 to 6 inches, ¼-inch and heavier, 1.66½c.; Angles, larger than 6 inches on one or both legs, 1.76½c.; Beams, larger than 15 inches, 1.76½c.; Zees, 3 inches and over, 1.66½c.; Tees, 3 inches and over, 1.71½c., with the usual extras for cutting to exact lengths, punching, coping, bending or other shop work. Local jobbers quote the minimum price on Angles, Beams and Channels, 1.90c., with 10c. advance for 18, 20 and 24 inch Beams and for Angles larger than 6 inches on one or both legs. These prices are for either random lengths or cut to lengths, but 10c. to 15c. higher is charged for very small or wasteful odds.

**Plates.**—The situation is strong, as it has been ever since the last advance, and mills are very generally sold up for some months ahead. Official prices at Chicago for shipment from mill in car lots are: Tank quality, ¼-inch and heavier, wider than 24 and up to 100 inches wide, carloads, Chicago, 1.66½c.; 3-16 inch, 1.76½c.; Nos. 7 and 8 gauge, 1.81½c.; No. 9, 1.91½c.; Tank quality, 24 inches wide and narrower, 10c. below these prices; Flange quality, any width up to 100 inches, 1.76½c.; Sketch Plates, in Tank quality, 1.76½c.; in Flange quality, 1.86½c. Store prices on Plates are as follows: Tank Plates, up to 100 inches wide, ¼-inch and heavier, 1.90c. to 2c.; 3-16 inch up to 72 inches wide, 2c. to 2.10c.; No. 8, up to 60 inches wide, 2c. to 2.10c.; lower gauges are quoted under the headings of Sheets. Beyond the base widths named extras from 10c. to 25c. per 100 lbs. are charged for wider widths; Flange quality is usually charged at 25c. extra.

**Sheets.**—The advances made recently have given a better tone to the whole Sheet market, and buying is more active than it has been at any time for a year past. The prices at Chicago for shipment from mill in car lots are as follows: Nos. 9 and 10, 1.81½c.; Nos. 11 and 12, 1.86½c.; Nos. 13 and 14, 1.91½c.; Nos. 15 and 16, 1.96½c.; Nos. 18 and 20, 2.21½c.; Nos. 22 and 24, 2.26½c.; Nos. 25 and 26, 2.31½c.; No. 27, 2.36½c.; No. 28, 2.46½c.; No. 29, 2.61½c.; No. 30, 2.71½c. Large jobbers have advanced their schedules of prices as follows: Blue Annealed Sheets, No. 10, 2.05c. to 2.15c.; No. 12, 2.10c. to 2.20c.; No. 14, 2.20c. to 2.30c.; No. 16, 2.30c. to 2.40c.; Nos. 18 and 20, 2.45c. to 2.50c.; Nos. 22 and 24, 2.50c. to 2.60c.; No. 26, 2.55c. to 2.65c.; No. 27, 2.60c. to 2.70c.; No. 28, 2.70c. to 2.80c. Galvanized Sheets, while not officially advanced, rule higher in tone and in some instances the prices have been advanced. The official prices remain as follows, f.o.b. Chicago, in car lots: No. 16, 2.61½c.; Nos. 18 and 20, 2.76½c.; Nos. 22 and 24, 2.91½c.; No. 26, 3.11½c.; No. 27, 3.31½c.; No. 28, 3.51½c. These prices range from 75, 10 and 10 at Pittsburgh in the heavier gauges to 80 and 2½ in the lighter. Store discounts range as follows, f.o.b. Chicago, warehouse: Nos. 10, 12 and 14, 75 per cent. to 70 and 10; No. 15, 75 and 2½ to 70, 10 and 5; Nos. 18 and 20, 75 and 7½ to 75; No. 22 and lighter up to 36 inches wide at 75 and 10 to 75 and 2½; all Sheets more than 36 inches wide in any gauge are held at a minimum of 70 and 10 and range from there to 70 and 5 discount.

**Bars.**—Statements made by the largest producers in Iron and Steel Bars indicate that the month of December was by far the largest month of 1904, and for at least one large company it was the banner month of all its history. Bar mills have already reached a position where they will not undertake to make shipments within four to six weeks from date of order even on desirable tonnages. Bessemer and Open Hearth Steel Bars are firm at 1.66½c., base, half extras, Chicago, in car lots; Iron Bars at 1.65c., base, half extras, in car lots; Soft Steel Hoops at 1.71½c. rates, full extras, in car lots; Soft Steel Angles, Channels, Tees and Shapes belonging to the Bar class, 1.76½c., half extras, Chicago, in car lots. Quantity differentials are added to the regular extras for size and for less than car lots, as follows: Less than 2000 lbs. down to 1000 lbs. of a size, 10c. extra; less than 1000 lbs. of a size, 30c. extra. Store prices on Bars are at 1.75c., minimum, for both Iron and Steel, with half extras on Steel and full extras on Iron, with 1.85c., minimum, half extras, on Angles and Shapes, and 2.10c., minimum, full extras, on Steel Hoops.

**Merchant Steel.**—Specifications are coming in at a lively rate from all quarters and prices are firm. We quote: Open Hearth Spring Steel is being held at 2c., Chicago, to the general trade. Other Prices, based on the new Bar schedule of December 20, are: Smooth Finished Machinery Steel, 1.81½c.; Smooth Finished Tire, 1.76½c.; Flat Sleigh Shoe, 1.61½c.; Concave and Convex Sleigh Shoe, 1.76½c.; Cutter Shoe, 2.30c.; Toe Calk Steel, 2.11½c.; Railway Spring, 1.76½c.; Crucible Tool Steel, 6½c. to 8c.; special grades of Tool Steel, 13c. and up. Shafting is unchanged for the present at 52 per cent. discount in car lots and 47 per cent. in less than car lots in base territory.

**Merchant Pipe.**—A new schedule has just been promulgated to go into effect making a horizontal advance in the shape of a reduction of one-half point in discount, or an average advance of $1 a ton on the material. The new discounts, Chicago, are:

| | Steel. | | Iron. | |
|---|---|---|---|---|
| | Black. Per cent. | Galv. Per cent. | Black. Per cent. | Galv. Per cent. |
| ⅛ and ¼ inch | 66.85 | 50.85 | 64.85 | 48.85 |
| ⅜ and ½ inch | 70.85 | 58.85 | 68.85 | 56.85 |
| ¾ to 6 inches | 74.85 | 64.85 | 73.35 | 63.35 |
| 7 to 12 inches | 69.85 | 54.85 | 68.35 | 52.85 |
| Extra strong, plain ends, ⅛ to ¾ inch | 59.85 | 47.85 | 57.85 | 45.85 |
| ½ to 4 inches | 66.85 | 54.85 | 64.85 | 52.85 |
| 4½ to 8 inches | 62.85 | 50.85 | 60.85 | 48.85 |
| Double extra strong, plain ends | 55.85 | 44.85 | 53.85 | 42.85 |

**Boiler Tubes.**—Official less than car lot prices on Boiler Tubes are unchanged at the following figures:

| | Steel. | Iron. | Seamless Steel. |
|---|---|---|---|
| 1 to 1¼ inches | 44.35 | 41.35 | 52.35 |
| 1⅜ to 2¼ inches | 56.35 | 41.35 | 40.35 |
| 2½ inches | 58.35 | 46.35 | 43.35 |
| 2¾ to 5 inches | 64.35 | 53.35 | up to 4 in. / 50.85 |
| 6 to 13 inches | 56.35 | 41.35 | .... |

While the car lot discount is officially only two points better, actual business is being transacted with independent mills at the following basis for car lots, Chicago:

| | Steel. | Iron. | Seamless Steel. |
|---|---|---|---|
| 1 to 1¼ inches | 50 | 42 | 55 |
| 1⅜ to 2¼ inches | 62 | 45 | 48 |
| 2½ inches | 64 | 50 | 49 |
| 2¾ to 5 inches | 70 | 57½ | 52½ |

The same price can be obtained at mill in less than car lots, in some cases with a small freight allowance subtracted. Store prices on Boiler Tubes are fairly well maintained:

| | Steel. | Iron. | Seamless Steel. |
|---|---|---|---|
| 1 to 1¼ inches | 42½ | 37½ | 40 |
| 1⅜ to 2¼ inches | 52½ | 35 | 37½ |
| 2½ inches | 55 | 37½ | 40 |
| 2¾ to 5 inches | 62¼ | 47½ | 47½ |
| 6 inches and larger | 52½ | .. | .. |

**Cast Iron Pipe.**—Business is seasonably light, but the market is unusually firm, with an upward tendency. Prices are unchanged, as follows: $28.50 a gross ton for 4-inch Water Pipe and $27.50 for 6-inch and larger, with $1 extra for Gas Pipe.

**Old Materials.**—What little trading has developed thus far this week has resulted in lower prices for Rails and higher for a number of other lines. Only one list is offered by the railroads—namely, about 800 tons by the Chicago & Northwestern. We quote per gross ton:

| | |
|---|---|
| Old Iron Rails | $21.50 to $22.00 |
| Old Steel Rails, 4 feet and over | 16.00 to 16.50 |
| Old Steel Rails, less than 4 feet | 15.50 to 16.00 |
| Heavy Relaying Rails, subject to inspection | 22.50 to 23.00 |
| Heavy Relaying Rails, for side tracks | 20.00 to 20.50 |
| Old Car Wheels | 16.75 to 17.00 |
| Heavy Melting Steel Scrap | 15.00 to 15.50 |
| Frogs, Switches and Guards | 15.00 to 15.50 |
| Mixed Steel | 10.00 to 10.50 |

The following quotations are per net ton:

| | |
|---|---|
| Iron Fish Plates | $20.00 to $20.25 |
| Iron Car Axles | 23.00 to 23.50 |
| Steel Car Axles | 17.50 to 18.00 |
| No. 1 Railroad Wrought | 18.50 to 19.00 |
| No. 2 Railroad Wrought | 17.50 to 18.00 |
| Shafting | 17.50 to 18.00 |
| No. 1 Dealers' Forge | 14.50 to 15.00 |
| Wrought Pipes and Flues | 13.25 to 13.75 |
| No. 1 Cut Busheling | 12.50 to 13.00 |
| Iron Axle Turnings | 12.00 to 12.50 |
| Soft Steel Axle Turnings | 12.00 to 12.50 |
| Machine Shop Turnings | 11.25 to 11.75 |
| Cast Borings | 8.75 to 9.00 |
| Mixed Borings, &c | 8.75 to 9.00 |
| No. 1 Mill | 9.50 to 10.00 |
| Country Sheet | 8.50 to 9.00 |
| No. 1 Boilers, cut to Sheets and Rings | 13.00 to 13.50 |
| No. 1 Cast Scrap | 14.25 to 14.75 |
| Stove Plate and Light Cast Scrap | 11.50 to 12.00 |
| Railroad Malleable | 14.25 to 14.50 |
| Agricultural Malleable | 13.50 to 14.00 |

**Metals.**—The markets are all strong, with sharp advances on many lines. Casting Copper is unchanged, at 15c. to 15⅛c., and Lake at 15¼c. to 15½c. Pig Lead has advanced to 4.62½c. for 50-ton lots, 4.67½c. for car lots and 5c. to 5¼c. for small lots. Pig Tin has advanced sharply and is held at 31c. to 31½c. in car lots. Spelter has advanced to 6c. in car lots, the small lots selling at about 6½c. Sheet Zinc has advanced another 15c. and is now held at 6.95c. in car lots of 600-ton casks and ¼c. to ½c. higher for small lots. We quote Old Metals as follows: Copper Wire, 13¼c.; Heavy, 13c.; Copper Bottoms, 12c.; Copper Clips, 12¾c.; Red Brass, 11¼c.; Red Brass Borings, 11⅝c.; Yellow Brass, Heavy, 9c.; Yellow Brass Borings, 7⅞c.; Light Brass, 7¼c.; Lead Pipe, 4¾c.; Tea Lead, 4.10c.; Zinc, 4½c.; Pewter, No. 1, 19¾c.; Block Tin Pipe, 26c.

**Coke.**—Connellsville Foundry Coke is offered at from $5.40 to $5.65 for strictly 72-hour Foundry, and about 25c. less for Furnace quality. West Virginia Cokes are quotable at about $2.50 at the ovens or $5.15, Chicago. Wise County, Va., Cokes can be had at from $4.50 to $4.75, Chicago. With the relief in the water famine comes an aggravation of the car famine, but it is not observed that any user of Coke has failed to receive his actual necessities in the market.

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Fred. C. Irvine, for a number of years in the employ of Joseph T. Ryerson & Son, has opened an office for the sale of Iron and Steel products and boiler makers' supplies at 153 La Salle street, Chicago.

## Philadelphia.

FORREST BUILDING, January 3, 1905.

It was hardly to be expected that much business would be done during the past ten days, but it is surprising what a good demand there has been, considering the circumstances and the season. Prices, too, have shown remarkable strength, and it is doubtful if any Pig Iron could be picked up at the inside prices of last week, most sellers asking 25c. advance. The same remarks would apply to Scrap material, for which some buyers are willing to pay a small advance on last week's prices, providing they can get the class of material they need.

It is a somewhat peculiar feature that consumers of Pig Iron claim that they are not getting satisfactory deliveries, while manufacturers of finished products claim that they are not getting prompt specifications. There is no great significance in this, however, considering the season, the underlying conditions being of the most substantial character.

At this early date it is impossible to say what the immediate course of the market will be, but it has certainly shown no impairment during the holidays and has the appearance of increased activity as soon as business fairly opens up.

Last week's quotations would hold good to-day in most lines, although it may be that in our next report advances will have to be made on both Pig Iron and Scrap material, as holders ask more money on some grades of both articles.

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The Philadelphia sales office of the Bethlehem Steel Company, W. B. Kennedy, sales agent, will on January 16 remove from the Philadelphia Bank Building, 421 Chestnut street, to Rooms 1516-1519 Pennsylvania Building. Robert C. Appleby, formerly of the Solid Steel Casting Company, Chester, Pa., has become associated with the Philadelphia sales office of the Bethlehem Steel Company.

## Cleveland.

CLEVELAND, OHIO, January 3, 1905.

**Iron Ore.**—There has been some talk of the revival of the Ore Association for the ensuing year. One of the leading members of the old association makes the statement that he does not see how this can be brought about. The reasons assigned for the belief that such an effort would meet with failure are that the old differences which divided the association have not been adjusted and a new one has arisen, that of the differential between the Old Range and the Mesaba Ores, which will make the re-formation of the association more than difficult. The production during the coming year will therefore be subject in all probability to the same sharp competition which marked the trade during the year just closed, and the prices which are obtained for Ore will be governed in the main by the law of supply and demand. The movement to the furnaces during the past summer, amounting to 16,658,806 gross tons, shows a decrease of only about 300,000 tons from the movement to the furnaces a year ago. Since the furnaces did not melt as much Ore during the past year as they did the year before it is fair to assume that they have as much on hand now as they had before. The amount on dock, however, December 1 shows a decrease. The amount on dock December 1, 1903, was 6,371,085 tons, against 5,669,895 tons on dock December 1, last year. This shows a falling off of about 700,000 tons in that respect. The indications are that while there is hardly a possibility of any shortage during the winter there will not be much Ore left on hand at the opening of the season of navigation this year. Both early buying and early shipments are therefore expected, and the Ore business opens the new year with a better prospect than it did a year ago. It is natural therefore that there should be some good inquiry for Ore at the present time. The producers, seeing the demand and understanding the possibilities, are abstaining from making commitments of any size for the time being. A few sales, however, have been made at prices ranging 50c. to 75c. higher than those paid a year ago.

**Pig Iron.**—There has been some inquiry for Foundry Pig Iron for second quarter delivery and a few sales have been made. The market is not really aggressively strong for that period. The furnaces are not courting orders, but are taking all of the tonnage offered them on the basis of $16.50 in the Valleys for No. 2 Foundry, with the other grades scaled on that price. The buying for first quarter shipment is not large, due to the small amount of material available. Prices range from $16.50 in the Valleys for No. 2 to $17. The Coke situation has not improved much. The rains have helped the producers, but a good many of them were so far behind with their shipments that it will take a week to ten days for them to catch up, and the increased supply will have but little if any effect on the market for a week or two. The result is that the market is about steady at the old prices of $2.75 at the oven for 72-hour Foundry Coke and $2.50 at the oven for Furnace Coke.

**Finished Iron and Steel.**—The market is running on an even keel. One of the prominent local factors in the trade says that if buying keeps up as it is for another month the larger mills will find themselves facing an operating proposition almost exclusively. In the Plate trade specification against old contracts is very heavy, exceeding in some instances the original estimate of requirements. Some good inquiries are also coming in which seem to be backed up by business. Specifications on Structural Material are also heavy and some new business of small dimensions is in sight. There is still a strong market for Bars. The agricultural implement works are buying to piece out their needs, and some of the finishing mills in northern Ohio are also good buyers. Their specifications against old contracts exceed, however, the new business which is in sight. The Bar Iron situation is still affected in the main by the prices of Scrap, which hold steady. The Bar Iron price is 1.65c., Youngstown, with fair buying, the price forbidding anything like heavy trading. In Sheets the principal business is in Black Sheets out of stock, which are quoted at 2.40c. for Nos. 22 to 24, and 2.10c. for the same gauge in car lots at the mill, as a base. The best buying in Billets is in the forging qualities, which hold a premium over the association price, being sold in the Cleveland market at $26.50 to $27. The Rail trade is looking up. Some new electric line projects are beginning to appear for the coming year, with possibilities of a good tonnage through northern Ohio sales offices. The demand for Light Rails is a little easier.

**Old Material.**—The Scrap market is about holding its own. The mills have assailed prices without any material results other than to prevent a further rise in prices. We continue to quote, all gross tons: Old Steel Rails, $15 to $16; Old Iron Rails, $25; Old Car Wheels, $17; Heavy Melting Steel, $16 to $17. All net tons: Cast Borings, $8; No. 1 Busheling, $14.50 to $15; No. 1 Railroad Wrought, $18 to $19; Iron Car Axles (nominal), $20 to $21; No. 1 Cast, $14.50; Stove Plate, $11 to $12; Iron and Steel Turnings and Drillings, $12 to $12.50.

## Cincinnati.

FIFTH AND MAIN STS., January 4, 1905.—(*By Telegraph.*)

**Pig Iron.**—The past week is but a repetition of the one that immediately preceded it. The lull incident to the holiday period is still apparent and very little business has been transacted for the past fortnight. There seems to be but very little inquiry pending and what sales have been made have been in no considerable tonnage. This state of affairs was not unexpected at this time and is not out of ordinary by any manner of means, but is simply the result of monotony incident to the winding up of the year. The lower grades, such as Nos. 3 and 4 Foundry and Gray Forge, are reported to be difficult to obtain in any quantities, with inquiries slightly on the decrease. The furnaces are said to have in many instances been unable to run to their normal capacity owing to labor troubles and lack of transportation facilities; in fact, the report is that some of them have even had to bank their fires temporarily pending the settlement of these conditions. Agents, however, are a unit in prophesying that there will be a vast tonnage required within the next week or two and anticipate heavy sales. Several furnaces that a week or two since absolutely refused to make any contracts for a period later than the first quarter are now said to be willing to contract into the second quarter of the year on the basis of present prices. To sum it all up, we would say that the market is firm and strong, merely waiting for the season of accepted inactivity to pass before resuming its wonted vigor. The leading Pipe interests are said to have secured 1000 tons of Southern and a central Ohio concern about 1000 tons of Malleable. These are probably the largest individual sales for the week, the others being in lots not exceeding 100 tons. Freight rates from Hanging Rock district to Cincinnati, $1.15, and from Birmingham, $2.75. We quote, f.o.b. Cincinnati, as follows:

| | |
|---|---|
| Southern Coke, No. 1 | to $16.75 |
| Southern Coke, No. 2 | to 16.25 |
| Southern Coke, No. 3 | to 15.75 |
| Southern Coke, No. 4 | to 15.50 |
| Southern Coke, No. 1 Soft | to 16.75 |
| Southern Coke, No. 2 Soft | to 16.25 |
| Southern Coke, Gray Forge | to 15.25 |
| Southern Coke, Mottled | $14.75 to 15.00 |
| Ohio Silvery, No. 1 | 19.15 to 19.65 |
| Lake Superior Coke, No. 1 | 17.65 to 18.15 |
| Lake Superior Coke, No. 2 | 17.15 to 17.65 |
| Lake Superior Coke, No. 3 | 16.65 to 17.15 |

*Car Wheel and Malleable Irons.*

| | |
|---|---|
| Standard Southern Car Wheel | $18.50 to $19.00 |
| Lake Superior Car Wheel and Malleable | 18.00 to 18.50 |

**Coke.**—The Coke situation is strained, owing to the scarcity of both labor and cars. The condition this week would undoubtedly have been greatly improved had not the holiday season intervened, thereby causing a dearth in labor conditions. Prices are very strong, the best grades of Connellsville being sold from $2.75 to $2.90, f.o.b. ovens.

**Plates and Bars.**—Agents report a very satisfactory closing of year with contracts secured far into the summer. The mills as a rule will not consider any propositions for a later period than the first half, presumably anticipating higher prices. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.65c., with half extras; the same in smaller lots, 1.90c., with full extras; Steel Bars, in carload lots, 1.53c., with half extras; the same in smaller lots, 1.75c., with full extras; Base Angles, 1.63c., in carload lots; Beams and Channels, in carload lots, 1.63c.; Plates, ¼-inch and heavier, 1.63c., in carload lots; in smaller lots, 1.90c.; Sheets, 16-gauge, in carload lots, 2.15c.; smaller lots, 2.70c.; 14-gauge, in carload lots, 2.05c.; in smaller lots, 2.60c.; Steel Tire, ¾ x 3-16 and heavier, 1.73c., in carload lots.

**Old Material.**—This market, in conjunction with other grades of Iron, is a waiting one with a healthy condition prevailing. Prices are firm and unchanged. We quote dealers' prices, f.o.b. Cincinnati, as follows: No. 1 Railroad Wrought Scrap, $17 to $18 per net ton; No. 1 Cast Scrap, $14 to $14.50 per net ton; Iron Rails, $21.50 to $22 per gross ton; Steel Rails, rolling mill lengths, $14.50 to $15 per gross ton; Relaying Rails, 56-lbs. and upward, $23 per gross ton; Iron Axles, $21 to $22 per net ton; Car Wheels, $15 to $16 per gross ton; Heavy Melting Scrap, $14.50 to $15 per gross ton; Low Phosphorus Scrap, $17 to $18 per gross ton.

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The submarine tunnel connecting Boston and East Boston, Mass., was opened for public travel December 30. It is double tracked, 1.4 miles long, 2700 feet of which is under the harbor waters. The cost of construction was $3,000,000. The tunnel is built entirely of concrete, and is said to be the only tunnel of that kind in the world. The system of ventilation includes the employment of a duct running through the upper part of the tunnel, with an air exhaust by the use of electric fans.

## Birmingham.

BIRMINGHAM, ALA., January 2, 1905.

The market the past week for Iron has been in keeping with the season and was of the usual holiday character, but there was no recession in prices. If there was any change at all it was in the leaning toward a higher range of values. Great indifference concerning business was manifested, and while some was turned down because the price bid was unsatisfactory there were some buyers who refused to meet the views of sellers. The result was a small volume of business at irregular prices. The majority of the interests here would not object if there was a cessation of orders for a while, so that they could give attention to the delivery of sales already made. They are in magnitude sufficient to keep them hustling.

The feeling in the trade is as yet of a very optimistic character, and the belief is universal that higher prices will prevail after the turn of the year. There is therefore a disposition to avoid being tied up with sales for long delivery, but sales for delivery during the second quarter will be made after the opening of the new year, for the prices current will be tempting enough to bring out the anticipated output for that period. The policy of the various interests is to pile no Iron when it will pay a profit at current values. This leads to only one conclusion.

As to current market values the leading interests sold some Iron in a limited way on the basis of $14 for No. 2 Foundry. The orders that commanded these prices were of a retail character. They show the hardening tendency of the market. The leading interests are now asking on the basis of $14 for No. 2 Foundry and are not a bit disgruntled when some buyers decline their price. There were a few sales that went at 25c. less, but there were conditions and circumstances that influenced action. Fair market quotations would be about $13.75 for No. 2 Foundry, and the buyer who gets it at that gets it for reasons.

As to stocks available for delivery on new business but one interest is known that could enter the market and deliver Iron. The stock unsold will aggregate not far from 50,000 tons, and conditions do not justify the expectation of increasing stocks, So far there has been little or no complaint about shipments of Iron, as cars have been in sufficient supply to meet demands; but the various roads will have all they can do to supply transportation for the freight offerings during the first quarter of the new year. Every system entering here has ordered additions to its rolling stock, but the business is piling up in like proportions and it is hard to keep abreast of it.

The most important incorporation of the past week was that of the Wolff Creek Coal Company, which is capitalized at $250,000, with R. L. Little as president; Z. P. Sheppard, vice-president, and W. C. Palmer, secretary and treasurer. It will draw its Ore from the neighborhood of Corona and Carbon Hill and its Coal from mines in Lamar County.

A new Soil Pipe Works was incorporated whose domicile will be at Gadsden. This new project is capitalized at $50,000, and among the influential members of the corporation is T. G. Bush, the president of the Alabama Consolidated Coal & Iron Company.

A stir was created in business circles when the E. I. Dupont Powder Company announced it would after the first of January transfer its Southern headquarters to this city. This move is strong evidence of the belief that we are bound in time to become the distributing center of a large and increasing tonnage for a constantly widening territory. Following in the wake of the Powder Company comes the Pittsburgh Plate Glass Company, which will also make this point the distributing center for its Southern trade. It will erect a warehouse and other buildings. The arrangements made by both of these companies indicate that they have come to stay.

The County Board of Revenue leased the labor of the county convicts to the Tennessee Company at a price that it is estimated will net the county in the next four years at least $400,000 more than in any like period since the inauguration of the system of hiring out the convicts. Able bodied men over 16 years of age cost the company per day about $1.60 per head and their keep.

There are several schemes in embryo that are not yet ready for publication. Oil has just been struck at Bon Secour, 40 miles south of Mobile on the east side of the bay. G. D. Fitzhugh and R. E. Enbanks of this city and E. C. Lewis of Nashville, Tenn., are the owners.

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Henry B. Hunter has resigned his position as secretary and treasurer of the Shadbolt & Boyd Iron Company, Milwaukee, Wis., after having been identified with it for 40 years, and will take up another line of business. He has been succeeded by John S. Blakney, who resigns his connection with the H. W. Johns-Manville Company as assistant manager of the Milwaukee office.

## Pittsburgh.

PARK BUILDING, January 4, 1905.—(*By Telegraph.*)

**Pig Iron.**—The Pig Iron market has been quiet in the past week and without special features. It is not yet known whether the Steel Corporation will buy any Bessemer Iron for January shipment, but if it does the tonnage is likely to be small. There is some inquiry for Malleable Bessemer Iron. We quote Bessemer and Basic Iron at $16 to $16.25, Valley furnaces. There is a fair demand for Foundry Iron from consuming centers outside of Pittsburgh, and Northern No. 2 is held at about $16.50, Valley furnace, or $17.35, Pittsburgh. Forge Iron is quiet, but firm, and we quote Northern makes at $15 to $15.50, Valley furnace.

**Steel.**—There is a very active demand for Billets, Sheet and Tin Bars, and all the mills are more or less behind in deliveries. Official prices of Steel no longer rule in the market, Bessemer and Open Hearth Billets for reasonably prompt shipment bringing $22 to $23, and Sheet and Tin Bars $25 and upwards.

(*By Mail.*)

As usual the holiday week in the Iron trade has been quiet and without special feature. However, the market continues strong in every way, and the outlook for the new year on which we have just entered is encouraging and holds out promise of being one of the best years the Iron trade has ever had. There is a growing scarcity of raw materials, especially Pig Iron and Steel, and consumers are paying premiums for the latter to get deliveries. The Carnegie Steel Company is operating all its Steel plants with the single exception of the Donora plant, and yet is said to be somewhat behind in deliveries of Billets and Sheet Bars.

It is possible that before this week is out the United States Steel Corporation may buy a limited tonnage of Bessemer Iron for January shipment, negotiations now being on with this in view. The price of the Iron is likely to be $16, Valley furnace, this being the ruling price asked by the furnaces in large lots, but for small lots as high as $16.25 to $16.50, at furnace, has been quoted. We note a moderate demand for Foundry and Forge Iron at unchanged prices.

The demand for Finished Iron and Steel is quite active, with one or two exceptions, being especially heavy for Sheets and Tin Plate, the American Sheet & Tin Plate Company operating this week 96 per cent. of its Tin Plate capacity and 89 per cent. of its Sheet capacity. Yesterday the National Tube Company made announcement of a slight advance in prices of Pipe and a readjustment in the price of Boiler Tubes. The Pipe trade is unusually active for this season of the year.

**Ferromanganese.**—We note some inquiry for Ferro, which is quite firm at the higher prices quoted for some weeks past. We quote 80 per cent. foreign and domestic Ferro at $43, delivered, for large lots, and $44 to $45 for small lots.

**Rods.**—The demand for Rods is active and prices are firm and higher. We quote Bessemer and Open Hearth Rods at $31 to $31.50, Pittsburgh, and sales of several good sized lots are reported at these prices.

**Skelp.**—We note a very active demand for Skelp, the mills being filled up with tonnage for several months, while prices are very firm. A sale of 2500 tons of Grooved Iron Skelp was made here last week at about 1.62½c., Pittsburgh. We quote: Grooved Iron Skelp, 1.60c. to 1.65c.; Sheared, 1.65c. to 1.70c.; Grooved Steel Skelp, 1.45c. to 1.50c., and Sheared, 1.50c. to 1.55c. These prices are for ordinary widths and gauges, f.o.b. cars maker's mill, terms 30 days, less 2 per cent. for cash in 10 days.

**Muck Bar.**—There is a moderate demand for Muck Bar and prices are firm on the basis of $28 to $28.50, Pittsburgh, for best grades of Bar made from all Pig Iron.

**Steel Rails.**—Inquiries are in the market from the leading roads for a heavy tonnage, part of which is expected to be placed very soon. We quote Standard Sections at $28, the mills equalizing freights. The demand for Light Rails is active, prices ranging from $23.50 for the heavier sections up to $27 for light weight Rails.

**Structural Material.**—A good many large inquiries are in the market and the outlook for the Structural trade for the new year is very satisfactory. We quote: Beams and Channels, up to 15-inch, 1.50c.; over 15-inch, 1.60c.; Angles, 3 x 2 x ¼ inch thick up to 6 x 6 inches, 1.50c.; Angles, 8 x 8 and 7 x 3½ inches, 1.60c.; Zees, 3-inch and larger, 1.50c.; Tees, 3-inch and larger, 1.55c. Under the Steel Bar Card Angles, Channels and Tees under 3-inch are 1.50c., base, for Bessemer, and 1.55c., base, for Open Hearth, subject to half extras on the Standard Steel Bar Card.

**Plates.**—Only a fair tonnage is being placed in Plates, many large consumers having covered their requirements for some time ahead before the recent advance in prices was made. However, the Pressed Steel Car Company and the Standard Steel Car Company have taken some very large orders for Steel cars, and other contracts of this nature are pending, so that a good deal of tonnage in Plates from these concerns may be confidently expected. It is said that prices are being firmly held. We quote: Tank Plate, ¼-inch thick, 6¼ to 14 inches wide, 1.40c., base; over 14 inches wide and up to 100 inches in width, 1.50c., base, at mill, Pittsburgh. Extras over the above prices are as follows:

| | Extra per 100 pounds. |
|---|---|
| Gauges lighter than ¼-inch to and including 3-16 inch Plates on thin edges | $0.10 |
| Gauges No. 7 and No. 8 | .15 |
| Gauge No. 9 | .25 |
| Plates over 100 to 110 inches | .05 |
| Plates over 110 to 115 inches | .10 |
| Plates over 115 to 120 inches | .15 |
| Plates over 120 to 125 inches | .25 |
| Plates over 125 to 130 inches | .50 |
| Plates over 130 inches | 1.00 |
| All sketches (excepting straight taper Plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches) | .10 |
| Complete Circles | .20 |
| Boiler and Flange Steel Plates | .10 |
| Marine, "A. B. M. A." and ordinary Fire Box Steel Plates | .20 |
| Still Bottom Steel | .30 |
| Locomotive Fire Box Steel | .50 |
| Shell Grade of Steel is abandoned. | |

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum, and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within ten days from date thereof, discount of ¼ of 1 per cent. is allowable. Pacific Coast not included.

**Sheets.**—The demand for both Black and Galvanized Sheets is heavy, most of the mills being pretty well sold up for this and next month. Some of the Sheet mills that buy Bars in the open market are having trouble in getting deliveries as fast as wanted. Prices on Sheets are very firm, but without change, and we quote: No. 24, box annealed, one pass through cold rolls, 2.05c.; No. 26, 2.15c.; No. 27, 2.20c., and No. 28, 2.30c. We quote Galvanized Sheets as follows: Nos. 22 and 24, 2.75c.; Nos. 25 and 26, 2.95c.; No. 27, 3.13c.; No. 28, 3.35c. We quote No. 28 Gauge Painted Roofing Sheets at $1.65 per square, and Galvanized Roofing Sheets, No. 28 Gauge, at $2.85 for 2½-inch corrugation. Jobbers charge the usual advances over above prices for small lots from store.

**Iron and Steel Bars.**—Tonnage being placed in both Iron and Steel Bars is fairly large, but some of the larger consumers placed heavy contracts prior to the advance in prices and are covered for some time ahead. Specifications on these contracts are coming in very nicely, and the mills have a good deal of work ahead of them. We quote Iron Bars at 1.65c., Youngstown, or 1.69¾c., Pittsburgh. We quote Bessemer and Open Hearth Steel Bars at 1.40c., base, for carload lots, with the usual advances for small lots.

**Hoops and Bands.**—As yet no change has been made in the price of Steel Hoops, which we quote at 1.55c., but this price is expected to be advanced before long. We quote Steel Bands at 1.40c., base, extras as per Steel Card.

**Tin Plate.**—The demand for Tin Plate continues very active and this week the American Sheet & Tin Plate Company is operating 96 per cent. of its capacity. Very heavy contracts have been entered for delivery in the first and second quarters of this year, and in some cases through the entire year, and this business, with the tonnage coming in right along, insures the Tin Plate mills a very active season for some time to come. We understand that premiums of 5c. to 10c. a box are being paid for prompt delivery. We quote 100-lb. Cokes at $3.50, net, f.o.b. Pittsburgh, terms 30 days, or 2 per cent. off for cash in 10 days.

**Merchant Pipe.**—Effective January 2, the National Tube Company advanced prices by lowering discounts on Merchants Pipe ½ point, the same advance being made by the independent mills. The demand for Pipe is very satisfactory, and the tonnage of the National Tube Company in 1904 was much heavier than in any year in its history. Inquiries are in the market for several large gas lines, but none of these has yet been placed. Discounts to consumers in carloads, effective from January 2, are as follows:

*Merchant Pipe.*

| | Steel. | | Iron. | |
|---|---|---|---|---|
| | Black. | Galv. | Black. | Galv. |
| | Per cent. | Per cent. | Per cent. | Per cent. |
| ⅛ and ¼ inch | 68½ | 52½ | 66½ | 50½ |
| ⅜ and ½ inch | 72½ | 60½ | 70½ | 58½ |
| ¾ to 6 inches | 76½ | 66½ | 75 | 65 |
| 7 to 12 inches | 71½ | 56½ | 70 | 54½ |
| Extra strong, plain ends. | | | | |
| ⅛ to ⅜ inch | 61½ | 49½ | 59½ | 47½ |
| ½ to 4 inches | 68½ | 56½ | 66½ | 54½ |
| 4½ to 8 inches | 64½ | 52½ | 62½ | 50½ |
| Double extra strong, plain ends, ⅛ to 8 inches | 57½ | 46½ | 55½ | 44½ |

**Boiler Tubes.**—On January 2 the National Tube Company made a readjustment in discounts on Boiler Tubes, equivalent to a slight reduction on some sizes. We are advised that the demand is quite active for this season of the year. Discounts to consumers in small lots effective from January 2 are as follows:

*Boiler Tubes.*

| | Steel. | Iron. |
|---|---|---|
| 1 to 1½ inches | 45 | 48 |
| 1¾ to 2¼ inches | 45 | 60 |
| 2½ inches | 50 | 62 |
| 2¾ to 5 inches | 57½ | 68 |
| 6 to 13 inches | 45 | 60 |

Discounts on Boiler Tubes in carload lots are two points lower than the above.

**Merchant Steel.**—We note a fairly active demand, but a good many consumers covered for some time ahead prior to the advance in prices. We quote: Tire Steel, 1.60c. to 1.65c.; Open Hearth Spring Steel, 2c. to 2.10c., depending on order; Smooth Finished Machinery Steel, 1.60c.; Toe Calk Steel, 1.95c. to 2c.

**Spelter.**—The demand is more active than for some time, and prices are firm and somewhat higher. We quote prime grades of Western Spelter at 5.88½c. to 5.91½c., Pittsburgh.

**Connellsville Coke.**—The new year finds the Coke trade in very satisfactory condition and the outlook could not be better. The heavy rains and snow thaw last week gave the Coke makers and the railroads an ample supply of water, and this has resulted in an increased output. The total output of Coke in the Connellsville region in 1903 was about 13,000,000 tons, but it fell below this in 1904 and probably did not reach 12,000,000 tons. The total output of Coke last week in the Upper and Lower Connellsville regions was over 300,000 tons, the heaviest output in one week for some months. We quote best grades of Connellsville Furnace Coke at $2.10 to $2.25 a ton, and 72-hour Foundry at $2.25 to $2.50 a ton, some concerns marketing their entire output at the latter figure.

**Iron and Steel Scrap.**—There is a lull in the demand for Scrap, due to the shutdown and inventory periods among the mills, but prices continue firm in the absence of any large buying. We quote: Heavy Melting Stock, $16.50 to $17, gross tons; No. 1 Wrought Scrap, $17 to $17.50, net tons; Busheling Scrap, $15.50, net tons; Cast Iron Borings, $11, gross tons; Wrought Turnings, $13.50, gross tons; Bundled Sheet Scrap, $13.75 to $14, gross tons; Iron Axles, $24, gross tons; Steel Axles, $19, gross tons; Steel Rails, $16.50 to $17, gross tons; Long Pieces, $17, gross tons.

## Advantages of the Latin Alphabet.

If Japan decides to adopt the Latin alphabet in place of its own quaint and more ancient symbols, it will have an important effect in facilitating commercial relations between the empire and the remainder of the civilized world. It is stated that a commission is now investigating the subject with a view to making the important and radical change, and with fair prospect of carrying it through to a successful conclusion. Already the Japanese business man uses the English, or Latin, alphabet in his correspondence with the rest of the world, for he has linguists at his command to take care of this class of correspondence. But in many ways it would be a commercial advantage if the handling of Japanese goods and the selling of foreign goods in Japan could be done without the use of the Japanese alphabet. The intelligent labeling of goods for the Japanese trade would be one advantage. It would be fully as important, perhaps, if Germany would do likewise, though to-day the German alphabet is pretty well understood; surely understood, of course, by those who understand the German language; and it may be argued that to others it makes no difference what alphabet be used, for they would understand neither. Yet many men in commercial life get a gleaning of a language, such as French and Italian or Spanish, that they find difficult to accomplish with the German. With the Japanese it is impossible. Quite remarkable instances might be cited to show the intimacy that some business men acquire with a foreign language, though they are wholly untutored excepting by the daily lessons that come with the transaction of business. The universal alphabet must be a natural sequence of the closer relations, both commercial and intellectual, between the peoples of the world. It is easy to foresee that within a comparatively few decades, perhaps sooner than the most sanguine would dare to assert, the Chinese characters will be lost so far as intercourse with the rest of the world is concerned. The example of the Japanese should be an important one for this and other reasons.

## Evening Trade Schools at Worcester Polytechnic.

An interesting experiment is being made at the Worcester Polytechnic Institute, Worcester, Mass., in permitting two evening trade schools to be conducted in its engineering laboratories. One is termed an automobile school, the other a school for stokers. The Polytechnic is not mixing trade schools with its engineering courses. It merely loans the use of its laboratories, and its instructors are the masters of the schools. These trade schools are a part of the plan of the Young Men's Christian Association, and are conducted as the gymnasia of the Young Men's Christian Association are conducted all over the country, open to all who will pay the fee. The plan originated at Boston, and similar schools are in operation at Providence and Springfield, Mass. That at Worcester is the most complete and practical because of the great advantage offered by the co-operation of the Polytechnic Institute.

There are 50 members of the automobile school, consisting of owners and prospective owners of automobiles and of mechanics who are to take up this specialty. The automobile mechanism and parts are dissected from end to end. The automobile testing apparatus, which has been described in *The Iron Age*, is employed to good purpose, for the pupil of the school is given the necessary instruction in handling his machine, by actually entering it, starting the engine, adjusting his mixture, running at different speeds, and actually doing all these things while the engine is running and the driving wheels are revolving, the machine body remaining stationary, the energy being taken up on the drum against which the driving wheels rest. It may readily be seen that the pupils of this school will get a long start toward an intelligent understanding and practical operation of their machines, which is well not only for themselves, but for the public.

The school for stokers has 25 pupils. The number is significant when it is realized that these men pay $35 each for their tuition two evenings a week during a comparatively short winter term. They are mostly young men who aim to be first-class stationary engineers. They are taught the secrets of success in the boiler house, and also the essential principles and practices of the engine room, the aim being to fit them to pass the examinations prescribed by Massachusetts laws in order to receive first-class licenses as engineers. It proves the earnestness of purpose of the pupils. These two schools are beginnings of larger similar work of much wider scope.

Polytechnic institutions of other cities may hesitate to loan their laboratories for such a purpose. Yet such a loan would do a vast deal of good to young men who have the necessary ambition and brains to try to better their condition by devoting their evenings to study. These men sometimes develop into important members of engineering professions.

## The New York Pig Iron Warrant Market.

Owing to the holidays and the absence of some of the more active traders the demand for pig iron warrant certificates the past week was very quiet, and but little of interest transpired. The sales aggregated about 700 tons, a little less than the amount of transactions the previous week. The following are the quotations established on call Wednesday noon:

| | Bid. | Asked. |
|---|---|---|
| Cash | $17.00 | ..... |
| January | 17.10 | $17.20 |
| February | 17.20 | 17.25 |
| March | 17.05 | 17.30 |
| April | 17.00 | 17.40 |
| May | 17.00 | 17.20 |
| June | 17.00 | 17.25 |
| July | 16.75 | 17.25 |
| October | 16.50 | 17.00 |

It is reported that the Louisville Bolt & Iron Company, Louisville, Ky., has been purchased for $150,000 by a syndicate of New York, Philadelphia, Pittsburgh and Cleveland capitalists, who intend to double the capacity of the plant.

# The Machinery Trade.

## Bright Prospect of the New Year.

NEW YORK, January 4, 1905.

While the year 1904 presented many disappointments to machinery merchants, these were caused not so much by an actual dearth of orders as by the fact that an extraordinarily heavy inquiry existed, which led the merchants to expect very much more business than actually materialized. The general run of business was good, better in fact than that of the preceding year, but throughout the entire year a constantly increasing aggregation of unusually large inquiries hung over the market, and despite many strenuous efforts on the part of the machinery trade they persistently remained suspended, just out of reach, foiling every attempt to bring toward consummation the business which they held in promise.

Among many large corporations which are justly looked to as heavy consumers of machinery the year just closed was one of procrastination. They admitted their need of additional equipment, for they sent lists covering their requirements to the trade for estimates, and in many cases these lists surprised the bidders on account of their great size. Once they received the figures they were consigned to the "pigeon hole" of the purchasing agent's desk. Inquiry on the part of the machinery merchant led to the explanation that the matter was being held in abeyance temporarily pending the decision of the Executive Committee, "the board" or some other financial interests. In certain instances Wall Street banking houses held the power of decision. As their orders were all in the direction of retrenchment, the bids remained in the pigeon hole of the purchasing agent's desk, and the works were compelled to go on with their efficiency impaired and make the best of things without the needed equipment. The most forcible examples of this state of affairs are to be found in the cases of the railroads. Millions of dollars' worth of needed improvements were held back last year by the large railway systems on account of the restraining influences of Wall Street. Consequently the rolling stock was allowed to deteriorate, and here enters the feature of greatest interest as to the bearing of the case upon the future. Railway equipment and, in fact, no mechanical equipment, can be neglected for any considerable length of time. Many railroads and industrial corporations neglected their mechanical equipment last year. They have held back purchases of needed new machinery. General business is on the mend. Plants will soon be humming their tunes of liveliest activity. Railroads will be called upon to exert their maximum carrying capacity. And then many a squeak and discord will be heard. The plants will then show most lamentably their need for the pigeon holed machinery, and the railroads will realize the utter incapacity of their shops to place their neglected rolling stock in shape for the tax placed upon it. Then there will be a scramble for machinery, and the prices quoted will be somewhat higher than those now named by the pigeon holed bids. This is a condition predicted by many for the year 1905, The prediction is made by sober minded, conservative business men who have followed the trend of affairs in the machinery trade most diligently and keenly.

### Purchases to Be Made by Railroads.

In contemplating the outlook for the new year, then, one of the first points to be considered is the reconstruction and extension of works and the building of new plants which were postponed last year and are of such importance as to require consummation during the coming year. Of such work a great deal will readily be found by just a glance backward over the more important projects which have come to the general notice of the trade.

In railroad work the most important operations will naturally be sought in connection with the Pennsylvania system. While toward the latter part of 1904 this company came into the machinery market for large quantities of new equipment, the great bulk is still to be secured. The 1905 appropriations for fitting out new shops and expanding the old throughout the five grand divisions of the system have not been made as yet. We are informed on good authority that these will be the largest in the history of the company. There still remains a great deal of machinery to be purchased for the new shops in and near Altoona, Pa. The Juniata locomotive shops have recently been extended and a large amount of heavy machinery is required. At Blair Furnace, a little northeast of Juniata, new shops must be erected in conjunction with the new roundhouse, which is the largest in existence, while at South Altoona, or just in the opposite direction from Altoona proper, where the new foundry work is in progress, a complete line of equipment must be obtained for the great new gray iron foundry. The new wheel foundry at this point is now in operation, but the gray iron foundry, at which locomotive cylinders and all forms of cast iron work will be produced, is not yet under roof. The steel frame for the great structure is about completed and none of the mechanical equipment has been ordered as yet. The power station is running beautifully. It will generate the electric power by which all of the machinery of the foundries will be operated. Nothing has been done at this point as yet toward building the brass foundry and pattern shop. When all of these foundry buildings are completed and the plants in operation a large amount of space now occupied by the foundries at Altoona proper will become available. This will be utilized for the extension of the machine shops, including principally a new locomotive frame department and an enlarged wheel turning shop. The shops at Altoona are very much overcrowded, and, hence needed additions in the way of machinery cannot be made until more room is gained by the moving of the foundries to South Altoona. At Fairview, near Harrisburg, a great new shop system is under construction, and for its equipment a large amount of machinery must be purchased this year. At Renovo extensive operations are also planned for this year, while up along the Pittsburgh & Erie division a good deal of machinery will be consumed. An idea of the requirements of this company may be formed from the fact that during the last fiscal year the purchases of equipment, machinery and shop tools aggregated $11,830,780.90 in value. This, of course, includes rolling stock. The new terminal of the Pennsylvania Railroad at Washington, D. C., will require a large amount of new machinery, including principally power generating apparatus. A good sized repair shop will also be included, however.

The bulk of the machinery for the new shops of the Lehigh Valley Railroad at Sayre, Pa., will doubtless be purchased before the new year has progressed very far. This list, it will be recalled, specifies something like $125,000 worth of machine tools, being principally of heavy design and all being electrically driven.

During the first half of the year the work of the Delaware, Lackawanna & Western Railroad at Kingsland, N. J., will be well under way. Then some excellent contracts may be looked for, as the scope of the new shops is to be wide, and eventually this point will be adopted as the principal locomotive and car repair center on the eastern end of the system. Later on the works will be still further extended so as to allow for the building of cars and perhaps locomotives outright. The Dover shops will be moved to Kingston this year.

The extensive contemplated improvements of the Erie Railroad at Jersey City include a large new shop system, for which the equipment will doubtless be secured before the close of the year. Buildings now in course of construction for shop and roundhouse purposes will cost in the neighborhood of $100,000.

A large portion of the list of the Philadelphia & Reading Company which the machine tool trade estimated on some months ago still remains to be purchased. Some of the tools were bought piecemeal, but the major portion has not been decided upon as yet.

The New York Central system has been buying machinery very sparingly during the last year, and indications are that the rule will be rather reversed during the coming year. The work of reconstructing the shop system of the road has only been fairly begun. At De Witt, near Syracuse, the most important developments for 1905 will be looked for.

It is well known that the Union Pacific Railroad Company has big plans in view in the way of new shops, and it is believed that these will be put into operation in real earnest soon after the beginning of this year. During the last year this company has allowed its shop system to remain somewhat neglected.

The Chicago, Milwaukee & St. Paul Railroad Company, which has commenced the work of adding a passenger car repair shop to its plant at Milwaukee, announces further improvements for next spring. These will include principally extension to the present car and locomotive building departments. A pattern shop is also to be added.

The Pittsburgh, Cincinnati, Chicago & St. Louis Railway, which is one of the branches of the Pennsylvania system, states that a great amount of machinery is to be purchased and other work put through during this year, for which a bond issue of $8,000,000 has been arranged.

The Detroit Southern Railroad Company is looking for a site for new main line shops, and if the proper inducements are not to be had at Springfield, Ohio, where the present headquarters are, a location elsewhere will be decided upon this spring.

At Douglas, Ariz., the El Paso & Southwestern Railroad Company will erect large new shops, plans for which are now almost completed.

The St. Louis & San Francisco Railroad Company, St. Louis, Mo., known here as the "'Frisco System," is rebuilding its shops at Memphis, Tenn. It will soon have a very large list of specifications ready.

The United Railroads of San Francisco, Cal., has a set of plans for a new shop system about completed, and its erection is scheduled to take place during the ensuing year.

The Toronto, Hamilton & Buffalo Railway Company, Hamilton, Ont., is rebuilding repair shops, roundhouses, &c., and will soon be in the market for the necessary equipment.

The Grand Trunk System having during the last year done considerable in the way of shop improvement will this year turn its attention toward the St. Clair Tunnel, which between Port Huron and Sarnia will be equipped for electrical operation in substitution for steam.

The new Grand Trunk Pacific Railway, which is to be the most northerly transcontinental route, will doubtless begin operations this year, as arrangements have been completed for financiering the project. In this connection it should be stated that with the building of this railway considerable activity may be looked for in the way of industrial development throughout the great Canadian wheat belt. Closely identified with the building of this railway is the project of the Canada Car Company of Montreal. As we have previously noted, the new plant to be erected at St. Henri will consist of about 15 buildings, covering an area of 50 acres. An immense quantity of modern machinery will be purchased for this plant early this year, as the work of construction has already begun. The company, which is capitalized at $3,000,000, has the backing of very strong interests, consisting of prominent Canadian financiers and American car builders. Although it is desired to patronize Canadian machinery builders as much as possible, it may safely be said that a great amount of American machinery will necessarily be installed in this plant, in view of the fact that it is to be fashioned closely after the works of the Pressed Steel Car Company at McKees Rocks, Pa.

### New Manufacturing Plants.

Along the lines of new manufacturing enterprises and extensive additions to existing plants there is a vast amount of work to be completed during the early portion of this year, which, while being launched last year, has not yet arrived at a stage where machinery purchases must be made. One of the most important of these is the erection of the new plant of the John A. Roebling's Sons Company, near Kinkora, N. J. This work is scheduled to be started in real earnest this year, and purchases of machinery which will ensue will doubtless foot up to a very large total.

At the Bethlehem Steel Corporation's plants considerable activity may be looked for during the ensuing year. It is well known that several of the old shipbuilding plants are sorely in need of additional new equipment, and it is also known that the inclinations of Charles M. Schwab, the ruling factor of the corporation, are favorable to the spending of the necessary money to bring the plants up to the required standard of efficiency. The largest sums will doubtless be spent on the Bethlehem and Union Iron Works plants.

The great electric companies spent comparatively little money last year for additional machinery equipment, although they went ahead with new buildings which will necessitate the purchase at some time of very large quantities of new equipment. The General Electric Company has two immense new buildings completed, for which very little machinery equipment has been secured. They are both located at Schenectady and will be used for the building of steam turbines and transformers. In view of the great business in electrical apparatus in sight it is believed that the company can no longer hesitate in the purchase of the required equipment.

The Westinghouse Company has a very large addition to its instrument plant at Newark underway, the buildings being about completed. The machinery equipment has not been purchased as yet.

The complete new plant of the Otto Gas Engine Works, Philadelphia, Pa., which is to be built at Wilmington, Del., will doubtless be erected before the new year has gone many months.

The Seamless Steel Bath Tub Company, Detroit, Mich., which is backed by very prominent financial interests, is now actively engaged in the completion of details preparatory to the erection of a large new plant. For this purpose a considerable quantity of machinery must soon be secured. The matter of equipment is, in fact, already being looked into.

The Petroleum Machine Works Company, manufacturer of all classes of steel plate construction, at Washington, Pa., has purchased 17 acres of land at Arden Station and will erect a complete new plant during the coming spring.

The United Sttaes Brick Company, Reading, Pa., recently capitalized at $5,800,000, has announced that during the coming year it will construct plants in a number of large cities throughout the United States.

The Cheswick Mfg. Company, Cheswick, Pa., is to build a large new plant to replace the one recently destroyed by fire, at which agricultural pressed steel and hardware specialties will be produced.

The Corinth Engine & Boiler Works, Corinth, Miss., intends commencing the construction of a new boiler plant early in the spring.

The Knox Motor Truck Company, Springfield, Mass., will built a new plant for the manufacture of automobiles, and the Robb-Mumford Boiler Company has secured a 10-acre site at South Framingham, Mass., for a new plant to build the Mumford internal fired boiler.

The Crescent Forging Company, Pittsburgh, of which Reuben Miller, Jr., is the head, is now opening negotiations for the construction of a new plant at Oakmont, where a 7-acre site has been secured.

The Standard Roller Bearing Company, Philadelphia, Pa., which has purchased a considerable amount of machinery in the screw machine and grinding machinery classes during the past few months, intends to make further extensions to its plant which will require the purchase of additional machine tools early this year.

The Goulds Mfg. Company, Seneca Falls, N. Y., builder of pumps and hydraulic machinery, is now at work on the large extension to its machine shop, and in the course of the year will erect a number of new buildings, greatly augmenting the capacity of the works.

### Tunnels and Power Plant Equipment.

From present indications it looks as though the construction of subways and tunnels in and about New York City has just fairly begun. There is already considerable planning in progress for the extension of New York's present subway system, and franchises have been granted to other interests for similar underground railways. Some of these enterprises are backed by influential interests and their consummation is doubtless assured. A good deal of work will probably be begun during this year. While the tunnels of the Pennsylvania Railroad underneath the Hudson and East rivers have been commenced, contracts are yet to be let for the underground work crossing the island of Manhattan and cutting under Bergen Hill at the New Jersey approach. These contracts will amount to considerably more than might be expected at first thought. They will be awarded before the close of the present year. The importance of this work in the way of advantages accruing to the Pennsylvania system has been fully appreciated by other railways having their terminals in New Jersey and the adoption of a similar method of entering the metropolis direct will doubtless be employed by these roads. The plans of the Delaware, Lackawanna & Western have doubtless progressed furthest in this direction. Another tunnel project is planned for operation underneath the Delaware River, being planned by the Intercity Railroad and connecting Philadelphia with Camden, N. J.

The operation of the great network of tunnels calls for the establishment of a number of large electric stations. There will doubtless be considerable activity along these lines during the coming year. In fact, a very large addition to the power station of the Interborough Company is already planned, and work will necessarily be commenced before the new year is very far advanced. The contracts for the equipment of the great power stations to be used in operating the Pennsylvania Railroad tunnels will be placed this year. The question of handling the suburban traffic in the neighborhood of New York City by means of high tension electric systems has come very prominently to the front during the last year, and within the next few months the work of electrification will begin on a number of the roads. The Public Service Corporation of New Jersey, which controls all of the electric and gas properties in the State, is at present alive to the benefit of high tension trolley service and is doing a great deal of work throughout the State in the direction of improving its power generating facilities and speeding up its various lines. The great new station on the Hackensack Meadows will receive the bulk of equipment for its first installation during the coming year.

### Government Purchases.

There is every evidence that the new year will bring forth very heavy purchases of machinery on Government account. The United States Government will require enormous quantities for the construction of the Panama Canal. The naval estimates indicate that unusually heavy purchases may be expected from the Navy Department, and lessons taught by the war in the Far East will doubtless prove an incentive to increase activity in the manufacture of artillery at the various United States arsenals.

The purchases in the interest of the Japanese and Russian Governments may be expected to increase rather than otherwise. The work of reconstruction of all that was destroyed during last year's warfare must soon begin in earnest, and this will necessitate the buying of great quantities of machinery of almost all kinds.

### Doings of Last Week.

During the last week a comparatively small number of new projects came to the front. One of the most important matters was the decision on the part of the Board of Estimate and Apportionment and Mayor McClellan of New York City to have plans prepared for a municipal gas and electric light works. It is the intention to erect a plant of sufficient size to furnish light for all of the streets of the city and all public buildings. Some delay may be encountered before the actual work of construction may be commenced, as additional power will be sought from the State Legislature in addition to that which is already vested in the Board of Aldermen. There is a possibility of legal entanglement, as strong interests will doubtless be opposed to the municipal ownership plan. Whether this programme of the municipality will alter the plans of the New York Edison

Company which look toward the extension of its generating capacity is not known, but it is believed in the trade that the plans of the latter company may at least be held up temporarily.

William Barclay Parsons has just submitted to the Rapid Transit Commission plans for another extension to the subway system, which in Manhattan Borough contemplates the expenditure of about $40,000,000, while other extensions in the Bronx and Brooklyn involve an expenditure of $9,000,000.

The New York, Westchester & Boston Railway Company has retained William Barclay Parsons as its chief consulting engineer. Mr. Parsons has just resigned as chief engineer of the Rapid Transit Commission, and during the next few years will give a large part of his time to supervising the construction work of the Westchester Railroad. William A. Pratt has been retained for two years as chief engineer of Westchester Company. He has just resigned as chief engineer of the Staten Island Rapid Transit Railroad Company. John Bogart, formerly State Engineer, who, as engineer for the company, had mainly to do up to the present time with the preparation of its plans, will continue as a consulting engineer of the Westchester Company.

Contracts will be let by the Davenport Locomotive Works, Davenport, Iowa, in about 30 days for considerable improvement to its plant. Immediate plans comprise the erection of a new boiler shop, probably of steel, brick and glass construction, the length to be from 150 to 175 feet, with arrangements for extension later, a crane space being provided 56 to 60 feet wide, besides the bays. This shop will be equipped with hydraulic flanging presses, hydraulic riveters, power rolls, shears, punches and a full complement of pneumatic tools. The capacity of the shop will be about ten complete locomotive boilers per week, and will be equipped with electric traveling crane and various hoists for boiler work. In addition to the above about $35,000 will be expended for new machine shop tools, including two or three large planers, one of which will be not less than 60 inches by 60 inches by 20 feet; one or two duplex slotters, a duplex boring mill, three milling machines of different sizes, and several lathes and drills. The blacksmith shop equipment will be increased by the introduction of an extra steam hammer of from 2500 to 3000 pounds weight. The company will also probably add from 80 to 100 kw. generator capacity to the present power house, the new tools being all motor driven.

The Geisel Automobile Company, Springfield, Mass., will be in the market for drill presses, lathes, grinders, planer and other tools for the equipment of a large automobile repair station to be established in that city.

The Exeter Machine Works, manufacturer of hoisting engines and elevating and conveying machinery, of Pittston, Pa., has announced its improvements, which will consist of a new machine shop, 80 x 250 feet, and a new power house with 1000 horse-power boiler, including complete electrical equipment, as all of the machinery for the new plant will be operated electrically. An air compressor and a large assortment of machine tools, as well as a 20-ton electric traveling crane for the machine shop, will also be required. J. N. Thomas is president of the works and A. L. Le Grand secretary.

The Santa Fé Railway system is considering the expenditure of $150,000 in improving the San Bernardino shops. Chief Engineer R. B. Burns, with offices at Los Angeles, writes that it has not been definitely decided as yet whether the new work will be undertaken during the present year or not.

The Belmont Iron Works of Philadelphia, Pa., has placed orders during the week for a portion of the machinery required for its new plant at Eddystone, Pa. These include a number of electric cranes, to be furnished by the Niles-Bement-Pond Company; a gate shear with a capacity of 1-inch plate, a single gag bending machine, a coping and punching machine and a double punch, all to be provided with electric motors and arranged with two punches and gags for each punch, purchased from Hilles & Jones, Wilmington, Del., and a rotary planer from the Newton Machine Works, Philadelphia, Pa. Air compressors were purchased from the Herron & Bury Mfg. Company, and a Deisel oil engine will be used for generating the required power.

Bids were opened last Saturday in the Bureau of Yards and Docks of the Navy Department for the construction of dry dock No. 4 at the Brooklyn Navy Yard. The bids were as follows: John Peirce of New York, $885,000; New York Continental-Jewell Filtration Company of New York, $829,880; United Engineering & Construction Company of New York, $815,934; Buckley Realty Construction Company of New York, $1,896,400; George B. Spearen of New York, $773,292.

The appropriation for the above work complete is $1,000,000, and the dry dock will be constructed of granite and concrete.

The supplies to be purchased by the Isthmian Canal Commission include a portable stone crusher for road and cement work.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until January 31 for a quantity of supplies for the Mare and Puget Sound navy yards, including punches, dry grinder, accessories for Brown & Sharpe milling machine, &c.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until February 4 for making improvements to 100-ton shears at the League Island Navy Yard. The funds available amount to $16,000.

**Catalogues Wanted.**—Adams & Schwab, mechanical engineers and contractors, whose main office is at Baltimore, Md., have opened up a branch office at 1745 Railway Exchange Building, Chicago. This step was made necessary by the fact that they have been put in charge of the power and mechanical equipment of Sears, Roebuck & Co.'s great plant in Chicago, in addition to their other Western work. They wish to receive catalogues of engineering supplies.

## The Philadelphia Machinery Market in 1904.

Almost every branch of the Philadelphia machinery market has felt more or less the result of the extreme inactivity during much of the past year. Although the dull period followed several years of prosperous business, it was nevertheless a heavy burden on many manufacturers. Not that they were entirely unprepared for a decline, the gathering forces of which were evident during the closing months of 1903, but the effect upon the present methods of manufacturers, particularly in the larger concerns and combination of interests, was in many cases an entirely new experience, and one which required the most careful handling in order to keep the wheels of industry turning.

Manufacturers began the year with only a fair amount of business on their books and orders decreased steadily as the year advanced. Before midsummer many plants had either greatly reduced their working forces or their number of working hours and in some instances had closed down entirely for varying lengths of time. In the early fall, however, business improved materially, and, while it did not come forward with any rush, during the latter months of the year a continued small gain was made in many directions, and from indications now apparent it promises to develop more rapidly early in the coming year.

The exact cause for the continual decline of business during the past year is difficult to attribute to any one source. While it has been a Presidential election year and according to some wise ones should therefore be a dull one, we can point to the previous Presidential year during which every one was particularly busy. Again the decline set in long before the nomination of candidates, or before any platform had been laid down by either of the great political parties and therefore could not be attributed to that source. In fact, before the canvass had progressed very far, the re-election of President Roosevelt was discounted and business in many lines improved previous to the national election in November. Lack of confidence in the ability of the country to absorb manufactured goods was probably the greatest factor in the decline. Many large producers found the market for their products falling off and a general retrenchment was ordered, and this followed all along down the line. Early in the year labor was still strongly inclined to assert what it called its rights and the result was continued strikes in the building trades; the foundry trade also had some difficulty with labor, but the general machine trade was not interrupted by these influences. During the latter half of the year labor disturbances have been at a minimum in this territory.

The effect of the past year's business on the different manufacturing concerns has been varying. The large combinations and individuals plants, who were manufacturing standard lines of tools or machinery, finding the general demand falling off, kept their plants in operation for a time on stock orders. This method, however, was only applicable for a limited period, as they found that with their largely increased facilities stocks became so large that they were rapidly becoming too heavy to carry and working forces and hours were reduced. This in some cases did not prove a sufficient remedy, and temporary shut downs were resorted to. Among the smaller plants much the same conditions existed, although it was not so hard to keep things moving; a small order here and there tided over difficulties for a time. Some manufacturers having several lines of tools or machines found that the demand for one or the other would drop off entirely and vary irregularly from one to the other. They were thus able to keep things moving, but few plants, however, have until recently had more than they could handle with their reduced forces.

Inquiries on the whole have been quite heavy; for a time they fell off largely, but the total number of inquiries placed has been entirely out of proportion with the resulting business. With business in as uncertain shape as it has been

during a large portion of the year, there has been a great amount of inquiry simply to feel the market and to get the probable cost of equipment, which might be used, if conditions should change, but this inquiry became practically dead as soon as quotations were received and in many cases even before they were received. It has been frequently said by different manufacturers that had they been able to close as much as 10 or even 5 per cent. of the inquiries received they would have been able to run their plants on full time and with a full complement of employees.

The supply of raw material during the past year has been as a rule very satisfactory; in fact the falling off in the demand for pig iron and fuel resulted in a considerable curtailment of production during the major portion of the year. Coke during the latter part of the year was quite scarce, due to extensive drought in the coke regions.

### The Export Trade.

There have been no extensive developments in the foreign demand for machinery and tools during the year just closed. Some exceptions are to be noted, particularly that business which has resulted, indirectly or otherwise, from the Russo-Japanese war. This business has as a rule been transacted very quietly and, while it is generally conceded that there has been a considerable quantity of it, the volume is difficult to estimate. The exportation of molding machines has gained on the total for the previous year, while the same may be said to be the case with pneumatic tools and air compression machinery. Cost of manufacture on the general lines of machine tools and special machinery has largely prohibited exportation during the past year. With plants operating irregularly fixed charges have been high, and it was impossible for manufacturers to get prices low enough to meet the competition of foreign made machine tools. Another drawback has been the general inactivity in the machinery interests abroad, some countries have been quite as dull during the larger portion of the year as the trade has been in the United States. What the possibilities for an improvement in this trade during 1905 are is not clear at the present time. The Russo-Japanese conflict should bring out considerable business and the closing of the war would probably bring about better conditions in the various Continental countries.

### The Machine Tool Trade.

Conditions in this branch of the trade have varied greatly. Most of the plants entered the year with sufficient work on hand for only a short time ahead. As the year advanced, the demand declined and before midsummer it was no easy proposition to keep wheels moving. The larger builders who kept their plants busy on stock orders during the early months of the year became loaded up before midsummer and sharp curtailments in working forces and expenses were made. Plants, some of which had during 1903 been operating at full capacity, double turn, ultimately reduced their forces from 50 to 60 per cent. and their working hours to from 40 to 50 hours per week, and even then found it difficult enough to keep their plants going on the greatly reduced basis. The smaller establishments were probably not in as bad shape, on the whole, as were the larger ones, who found it difficult at times to maintain their shop organization. The smaller manufacturers managed to keep going with fewer orders, which to the larger ones were not even as "a drop in the bucket." After the summer months conditions brightened and some good business developed. Railroads which had practically been out of the market for a time began ordering tools which they had already decided on purchasing several months previously, but deferred actual placing of the orders until now. Smaller orders for one or two tools began to come out more freely and a few fair sized contracts were closed up. This condition of affairs has made steady gains during the latter months of the year and, while there has been no rush to place orders, a better feeling permeates the entire trade and promises a larger distribution of business in the early months of the new year.

### Heavy Engines and Locomotives.

Both these branches of trade followed the general trend of the market, the former probably being in better shape on the whole than the latter. Heavy engine builders had a fair amount of work on hand at the beginning of the year, but it gradually fell off, the early summer months being probably the dullest. In August there was a material improvement and some good orders were closed about that time, but the demand weakened again toward the close of the year. Locomotive builders have also had an unsatisfactory year and production has fallen off materially.

Preparations had been made for an extensive trade during 1904, but the railroads in their retrenchment plans withheld the placing of orders in many instances until the early fall months and locomotive builders were consequently extremely dull. Early in November a partial recovery began and a good number of orders were taken, requiring the reemployment of some of the forces laid off as well as increasing the working hours per day.

### Smaller Tools, Engines and Boilers.

Owing to the general dullness of the trade business in these lines did not develop any very active features during the year. Prospective purchasers managed in most cases to get along without making extensive improvements in their equipment of small tools, or deferred purchases until late in the year, when conditions were improved and at which time a number of orders were placed. The boiler and engine manufacturers were more or less dull during the greater part of the year. In some cases this trade found itself at times almost bare of orders and at no time were orders on the books in such quantity as to make them extremely busy.

### Shipbuilding.

The Delaware River shipyards have not had a very satisfactory year. Orders for merchant vessels of any size declined, and Government orders for cruisers, battle ships and various other vessels have been the mainstay of most of the yards. The plants have therefore been operated more or less irregularly, depending on the class of work on hand at the particular time.

### Iron and Steel Foundries.

Iron and steel foundries have as a rule had a very unsatisfactory year. There was a gradual falling off in the demand for castings during the first nine months of 1904 and in many cases requirements are still at a low level. There have been no improvements to gray iron foundries, as far as the manufacture of machinery castings is concerned, during the past year. Stove foundries have, on the contrary, had an exceptionally good year and there are cases where the capacity of some of these foundries has been doubled, an instance of this kind being the new foundry of the Buckwalter Stove Company, Royersford, Pa., while several other manufacturers have additions of the same kind in consideration. Steel casting plants have been very dull almost throughout the year, but some improvement was noted during the fall months, although there is still plenty of room for business. Several large new plants have come into the field during the year, including the Brylgon Steel Casting Company, New Castle, Del., and the Delaware River Steel Casting Company, Chester, Pa. Steel casting plants have in most cases been running at a very low tonnage; one heat a day during part of the year was about the best that could be done. Gray iron foundries in many cases fell off to the extent of one or two small heats a week during the summer months. But this represents the extremes of the trade. Some plants kept going fairly well, and during the closing months of the year there was an improvement all along the line, which promises even better conditions early in the coming year.

### Improvement to Plants.

General business condtions did not warrant extensive improvements to manufacturing plants during 1904. A number which had been held over from the previous year were completed, while others were held up at various times. The railroads, which began extensive improvements during 1903, held back further extensions during 1904. The work of completing the new shops of the Pennsylvania Railroad at Shellport, near Wilmington, Del., was delayed, while the completion of others for the same company was for the time discontinued. Other improvements such as the new armor plate plant of the Midvale Steel Company.; Harrington & Sons' Inc. new machine shops; and the Williamson Bros. Company's new foundries, were carried over from last year and completed. The Standard Roller Bearing Company has made a number of additions to its machine shops and during the year has doubled their capacity. The Phillips Pressed Steel Pulley Works, manufacturing steel pulleys, and the Standard Pressed Steel Company, manufacturing pressed steel shaft hangers, are new concerns, who, while they have not built extensive plants, have become important in their respective fields. A number of propositions, some of good size, are now under consideration, but are held in abeyance until business conditions, by continued improvement, warrant the construction of further plants.

### Prices.

During the year there was considerable variation in prices on all classes of machinery and tools as well as on raw materials and supplies. The varying conditions in the demand resulted in reductions by some manufacturers from time to time, while others maintained the quotations made early in the year. Discounts depended largely on how badly the business was wanted and how strong the pressure was to move accumulating stocks, while on the other hand no quotation, however low, would at times induce a buyer to place an order. Under such circumstances prices did not figure very greatly. If a buyer needed the goods there was not much trouble to get a satisfactory price, as everybody was after the business. Toward the close of the year, with a general improvement in conditions, prices became firmer, and if the present demand continues for any length of time it is quite likely that they will make some further advances, as the prices of raw materials have already done.

### The Outlook for 1905.

It is the consensus of opinion that the trade during 1905 will be a great improvement over that of the past year. There has since September been a gradual betterment in conditions, which has developed not too strongly but consistently. Manufacturers who in August had a bare month's work ahead of them enter the new year with three to four months' work on their books. Inquiries are plentiful and have closed fairly promptly, and a large amount of new business is expected to develop during the early months of the year, probably during February or March. Equipment has been allowed to run to a low state of efficiency in many cases, and replacements have been postponed until after the turn of the year, when after annual stock taking, etc., consideration will be given the purchase of new tools and further equipment. There is also a good quantity of business pending from the railroads and specifications for further requirements are expected early in the year. The tone of general business is much more aggressive, and both manufacturers and dealers look with a great deal of confidence for a very prosperous year.

## The Chicago Machinery Trade in 1904.

Machinery makers and dealers would rather talk about the present revival in business and the bright future outlook than to become reminiscent over the extremely dull months that preceded. The year opened up rather encouragingly, but with the collapse of Wall Street securities toward the end of March and the withdrawal of the railroads from the machinery markets the bottom dropped out and six discouraging months followed, during which, as a rule, dealers who had stocked up liberally in January pursued the policy of getting rid of their stocks even without profit in order to reduce the burden which they were carrying.

The largest customers for the Chicago machinery houses during the year were the International Harvester Company, whose purchases were mainly for plants at Milwaukee and Hamilton, Ontario, with scattering orders for other plants; the Crane Company, which did not seem to mind the depression and bought fearlessly; the Western Electric Company, which discovered new needs for its new plant approaching completion; the Illinois Steel Company, which made extensive improvements during the year, and a number of smaller interests which bought more or less. The city of Chicago, in the latter months, was a large buyer of engines, boilers and other machinery for power plants, the most noteworthy purchases being two 40,000,000-gallon pumps and two 20,000,000-gallon pumps. The equipment of the power plant at Lockport for the Drainage Board was one of the largest individual items. Pawling & Harnischfeger and the Nordberg Mfg. Company were liberal buyers in Milwaukee for equipment for their plants. The Atchison, Topeka & Santa Fé and the Illinois Central railroads bought large equipments for machine and boiler shops in the West. The Chicago & Western Indiana equipped a large power plant in Chicago. The Rock Island and the Chicago & Northwestern bought considerable quantities of machinery for various shops. The Missouri Pacific bought equipment for its shops at Sedalia, Mo. An extensive equipment was purchased by John Cummings for a new car works plant at Paris, Ill. The Peoria Tool & Steel Company bought a large equipment. The Columbia Tool Steel Company, Chicago Heights, also equipped a new plant throughout.

As intimated above, dealers as a rule reduced their stocks to the lowest possible point during the dull period of midsummer and now many of them are wishing that they had in stock some of the machines they sacrificed at that time. Nearly all dealers are ordering extensively for the purpose of getting ready for the demand which has made itself manifest. Already there is a shortage on certain sizes of lathes and milling machines, and tool makers as a general thing are in a position where they are not promising deliveries with anything like the promptness they did earlier in the season. Large purchases made by the Japanese Government, the Russian Government and the Pennsylvania Railroad had something to do with reducing the available stocks of machinery, although but little of this business came to Chicago.

Somewhat higher prices prevail than those quoted in midsummer and the future looks bright to the machinery world. For the last 18 months machine users have bought less than their normal requirements, making shift with old tools where under ordinary conditions new ones should have been bought. This long period has been piling up wants that must be filled very soon, because while it may be possible and even profitable to get along with old machines when business is slack, none but new, modern appliances can be tolerated when plants are pushed to their full capacity. Such a condition is seen on the horizon of 1905 by Chicago machine interests.

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The Hendey Machine Company, Torrington, Conn., is now represented in New York, Philadelphia and Pittsburgh by Manning, Maxwell & Moore, and having discontinued its agencies with Hill, Clarke & Co. of Boston and Thomas & Lowe Machinery Company of Providence, will handle the New England territory direct.

## New York.

NEW YORK, January 4, 1905.

**Pig Iron.**—The market has been very quiet in this territory during the past week and few inquiries are at hand. Founders are having a good deal of trouble with their Coke supply and are not melting fast. Besides, in this district and in New England their business has not grown very much thus far. Buffalo furnaces, who were the low sellers, lately have advanced, asking prices to and above parity with other districts. We quote for tidewater delivery on Northern Iron: $17.75 to $18 for No. 1 X Foundry, $17.25 to $17.50 for No. 2 X Foundry and $16.75 to $17.25 for No. 2 Plain. Alabama and Tennessee Irons are quoted $17.50 to $17.75 for No. 1 Foundry and $17.25 to $17.50 for No. 2 Foundry.

**Steel Rails.**—During the past week the Vanderbilt lines have placed about 90,000 tons of Steel Rails, about one-half going to the Lackawanna mill and one-half to the works of the Steel Corporation. There has also been placed 10,000 tons for the Cincinnati, Hamilton & Dayton road and about 15,000 tons for the Reading system. It seems that the order for the Southern Railway, of which the Tennessee Company took 66,000 tons, aggregated a total of close to 125,000 tons. The Tennessee Company also took in December a lot of 15,000 tons for a Southern road and is full for the whole year. Light Rails are again higher and are now quoted $24.50 to $25. For the second half of the year the leading mills are asking $27. Standard Rails are quoted $28. The arbitrator in the matter of the percentage of the Lackawanna Company has confirmed its allotment at 15 per cent.

**Cast Iron Pipe.**—The Consolidated Gas Company of this city is receiving bids on 7000 tons. On January 6 bids will be opened for about 11,000 tons of Pipe and specials for the Brooklyn high pressure service. Apart from these matters no other business of importance is at present in sight. The general demand is quiet, as is usual at this season. Foundries are very well supplied with orders and prices are firm on the basis of $26.50 per net ton for carload lots of 6 to 10 inch at tidewater.

**Finished Iron and Steel.**—The American Bridge Company has been awarded the contract for bridge work for the Harriman lines. This contract calls for a minimum of 15,000 and it may be extended to cover 25,000 tons. If the maximum should be called for this will be the largest single contract taken by the company since February, 1901. Other inquiries are in the market from railroad companies which will shortly result in business. Very low prices are again being made on fabricated work. Some of the bridge companies are evidently quite eager to fill their order books, and in their anxiety to secure business are making prices fully as low as though no advance had been made on Beams and other Structural Shapes. The building trade is still quiet, but those interested have strong hopes that it will soon pick up. The usual holiday dullness is experienced in other branches of the Finished Steel trade. Quotations at tidewater are as follows: Beams, Channels, Angles and Zees, 1.64½c. to 1.80c.; Tees, 1.69½c. to 1.80c.; Bulbs, Angles and Deck Beams, 1.74½c. to 1.85c.; Sheared Plates in carload lots, 1.64½c. to 1.75c. for Tank, 1.74½c. to 1.90c. for Flange, 1.84½c. to 2c. for Marine, 1.84½c. to 2.50c. for Fire Box, according to specification; refined Bar Iron, 1.64½c. to 1.69½c.; Soft Steel Bars, 1.54½c. to 1.64½c.

**Old Material.**—The market is very strong. Transactions have been unusually heavy during the week. A leading firm in this line reports the business for the week the largest ever transacted in its history in the same time. Included in the orders taken were a round lot of 5000 tons of Heavy Melting Steel Scrap and another order for 2000 tons of Old Steel Rails. The business which came to light in all branches aggregated fully 15,000 tons. Inquiries are being received from Pittsburgh and the Central West for Heavy Melting Steel Scrap and other high grade material. Quotations per gross ton, New York and vicinity, are approximately as follows:

| | |
|---|---|
| Old Iron Rails | $20.50 to $21.50 |
| Old Steel Rails, rerolling lengths | 17.00 to 17.50 |
| Old Steel Rails, short pieces | 16.00 to 16.50 |
| Relaying Rails | 20.00 to 21.00 |
| Old Car Wheels | 16.00 to 16.50 |
| Old Iron Car Axles | 22.50 to 23.00 |
| Old Steel Car Axles | 20.00 to 20.50 |
| Heavy Steel Scrap | 16.00 to 16.50 |
| No. 1 Railroad Wrought Scrap | 20.00 to 21.00 |
| No. 1 Yard Wrought Scrap | 17.50 to 18.50 |
| Iron Track Scrap | 18.00 to 19.00 |
| Wrought Pipe | 15.00 to 15.50 |
| Ordinary Light Iron | 11.50 to 12.00 |
| Cast Borings | 9.50 to 10.00 |
| Wrought Turnings | 12.00 to 12.50 |
| No. 1 Machinery Cast | 15.00 to 16.00 |
| Stove Plate | 12.00 to 12.50 |

## Metal Market.

NEW YORK, January 4, 1905.

**Pig Tin.**—Until yesterday the market has remained quite firm. Immediately after the publication of the statistics, however, the market broke heavily as a result of the unfavorable conditions which the heavy shipments and increase in the visible supply portrayed. The shipments from the Straits for December were 1792 tons larger than for the same period of last year and for the entire year they show an increase of 5593 tons above the total of the year previous. The total visible supply showed an increase on December 31, 1904, of 494 tons above the corresponding date of the year previous. At this writing spot to February delivery is quoted 29.05c. to 29.15c., and February delivery is quoted 29c. to 29.15c. The London market shows a considerable decline as compared with the figures of a week ago. At the close to-day spot was cabled £132 5s. and futures were quoted £131 10s.

The total statistics for Europe and the United States, as compiled by C. Mayer, secretary of the New York Metal Exchange, show:

| | Tons. |
|---|---|
| Total visible supply, December 31, 1904 | 14,768 |
| Against supply November 30, 1904 | 14,412 |
| Against supply December 31, 1903 | 14,274 |
| Arrivals at Atlantic ports amounted to | 2,597 |
| Total arrivals since January 1, 1904 | 35,171 |
| Of which from Straits by direct steamers | 11,325 |
| Of which from United Kingdom | 21,753 |
| Of which from Holland | 597 |
| Of which from European Continent | 1,496 |
| The deliveries for December we figure as | 2,600 |
| Total deliveries since January, 1904 | 35,300 |
| Deliveries same period in 1903 | 37,900 |
| The shipments from Straits amounted to | 5,142 |
| Against previous month | 5,400 |
| Against December, 1903 | 3,400 |
| Australia shipped | 330 |
| Against previous month | 675 |
| Against December, 1903 | 300 |
| Statistics for the United States—Pacific ports excluded December 31, show as follows: | |
| Stocks, including on dock and arrivals | 1,241 |
| Afloat | 3,350 |
| Total | 4,591 |

**Copper.**—Although there has been no perceptible increase in the buying movement, the market has been stiffened up somewhat by the advancing of prices by the leading producers. The advances were made exclusively in this market, however, for the London quotations remain unchanged on spot standard Copper. The new quotations are as follows: Lake, 15.12½c. to 15.25c.; Electrolytic, 15c. to 15.12½c.; Casting Copper, 14.75c. to 14.87½c. Spot was quoted in London at the close at £68 15s. and futures were quoted £69 2s. 6d. Best Selected advanced to £72 10s. The exportation for the month of December footed up a little heavier than was generally expected, the total being 19,533 tons. The total exports for the year exclusive of Southern ports for December amount to 247,421 tons, as against 138,435 tons for the corresponding period of the year previous.

**Pig Lead.**—A very moderate demand is noted in this market, but prices are firm and without change, owing to the limited shipments from the West. Spot Lead in New York is quoted at 4.60c. to 4.70c. The St. Louis market has declined a shade and is quoted to-day at 4.52½c. to 4.62½c., according to brand. The London market has advanced slightly and was quoted to-day at £13, or 5 shillings above the price ruling at the date of our last report. The American Smelting & Refining Company still quotes on the basis of 4.60c. for "shipment" Desilverized in 50-ton lots.

**Spelter.**—The market is considerably firmer and some improvement in demand is to be noted. Spot Spelter was quoted to-day nominally at 6.10c. to 6.15c. The St. Louis market has advanced to 6c. London cables show an advance, quoting £25 5s.

**Antimony**—Is very weak and considerably lower. Cookson's was quoted to-day at 9c. to 9.25c., Hallett's at 8.75c. to 9c., Japanese at 8c. to 8.25c. and other brands at 7.75c. to 8c.

**Nickel.**—About the usual amount of business is noted. Prices are quoted for large lots at 40c. to 45c., with smaller quantities ruling at 50c. to 60c.

**Tin Plates.**—The advance of 10c. a box in the base price of Tin Plates made by the American Sheet & Tin Plate Company has been generally adopted by the outside mills. The advance is the natural outcome of the heavy demand which has characterized the market for some time and also of the higher prices being paid by the mills for Tin Bars. It is understood that a very heavy tonnage of Tin Plate has been booked by the mills for delivery in the first three months of next year, and also that some orders have been placed by the large Can interests for delivery through the first half of 1905. This Plate is now being made and will be kept in stock until the buyers are ready for it. Current business is rather light, as is natural at this time of the year, but the mills are all busily engaged and the market is very strong. The American Sheet & Tin Plate Company quotes on a basis of $3.74 per box for 14 x 20 100-lb. Coke Plates, f.o.b. New York, or $3.55, f.o.b. Pittsburgh.

## Iron and Industrial Stocks.

NEW YORK, January 4, 1905.

The year opens with decided strength in the stock market. Prices toward the end of last week suffered a slight reaction, from which a recovery took place on Tuesday of this week. The low point reached on active stocks was as follows: Can common 11¾, preferred 62½; Car & Foundry common 34, preferred 94; Locomotive common 34½, preferred 103⅞; Colorado Fuel 45⅞; Pressed Steel common 39, preferred 90½; Railway Spring common 33, preferred 93½; Republic common 16⅝, preferred 70; Sloss-Sheffield common 61⅞; Tennessee Coal 70½; United States Steel common 29¾, preferred 91½, new 5's 92½. The greatest decline during the week, fully $4 per share, occurred in Colorado Fuel, caused by the testimony given before the Interstate Commerce Commission at Washington relative to rebates allowed the company on its coal business by the Atchison, Topeka & Santa Fé Railroad Company. Recoveries from all low prices ranged from half a point to two full points. Prices at 11.30 a.m. to-day were as follows: Can common, 11⅞, preferred 63½; Car & Foundry common 34½, preferred 94½; Locomotive common 35¼, preferred 104½; Colorado Fuel 48¼; Pressed Steel common 39, preferred 90¾; Railway Spring common 33½, preferred 94; Republic common 17¼, preferred 71⅞; Sloss-Sheffield common 63, preferred 103; Tennessee Coal 71½; United States Steel common 30½, preferred 93½, new 5's 92⅞.

The Alabama Consolidated Coal & Iron Company, Birmingham, Ala., has reduced its capital stock from $3,500,000 to $2,500,000.

**Dividends.**—Westinghouse Machine Company, East Pittsburgh, Pa., has declared a quarterly dividend of 2½ per cent., payable January 10.

Pittsburgh Oil & Gas Company, Pittsburgh, has declared a quarterly dividend of 2 per cent., payable January 15.

Westinghouse Electric & Mfg. Company, Pittsburgh, has declared a quarterly dividend of 2½ per cent. upon the preferred, assenting and nonassenting stocks, payable January 10.

Rock Run Fuel Gas Company, Pittsburgh, has declared a quarterly dividend of 1¾ per cent., payable January 25.

Standard Underground Cable Company, Pittsburgh, has declared the regular quarterly dividend of 2 per cent. and an extra dividend of 2 per cent., payable January 10.

Manufacturers Light & Heat Company, Pittsburgh, has declared a dividend of 1½ per cent., payable January 20.

Nova Scotia Steel & Iron Company has declared a quarterly dividend of 2 per cent. on the preferred stock, payable January 15.

**Claim for Sale of Clairton Steel Plant.**—At Pittsburgh the Union Trust Company, formerly one of the receivers of the Clairton Steel Company, has entered suit against the Crucible Steel Company of America to recover $250,000 for services rendered in the Clairton sale to the United States Steel Corporation. The Union Trust Company will also within a short time file a large claim against the Crucible Steel Company of America for services for acting as receiver of the Clairton Steel Company. Should a verdict be secured on these grounds against the Crucible Steel Company it is probable that Wm. G. Park, the other receiver, will file a similar claim.

Officials of the American Sheet & Tin Plate Company left Pittsburgh December 27 for the purpose of making the regular semiannual inspection of some of its leading sheet and tin plate plants. In the party were: John A. Topping, president; C. W. Bray, first vice-president; E. W. Pargny, second vice-president; F. B. Ely, chief engineer; S. A. Davis, assistant to first vice-president; George S. Jenks, manager of order department; H. L. Austin, auditor; A. G. Young, traffic manager; R. A. McKinney, purchasing agent, and George P. Early, special agent. During the trip the party inspected 15 plants, all of which were found to be in the best physical condition, with the practice up to the company's high standard. They returned to Pittsburgh December 31.

The heavy rail mill of the Lackawanna Steel Company at West Seneca, N. Y., will start on the 9th inst.

A number of skilled employees at the Howard Axle Works of the Carnegie Steel Company, West Homestead, Pa., have gone out on strike on account of a reduction in wages recently made. Only part of the plant is affected by the strike, which will probably be settled within a few days.

# HARDWARE.

THE past year was one in which the trade did a good deal of thinking. Apart from the fact that some questions tangled and difficult have been forced upon their attention, owing to a variety of causes, Hardware merchants have got into the way, and it is a very hopeful sign of the times, of considering more reasonably and impartially perhaps than heretofore principles and practices in their relation to the successful conduct of business. It is getting to be generally recognized that the old ways are not necessarily the best ways and that new methods and a new spirit must characterize those who are to keep step with the quickening pace of these days. Many changes have within comparatively few years taken place, and changes are, to men who think, stimulating to thought. The presence of difficulties and perplexities is a challenge to the discovery of ways and means of overcoming them, and there are certainly enough of these confronting Hardware merchants and manufacturers to call for their best judgment, perhaps to tax their ingenuity and resourcefulness, and in many ways to summon into active exercise the qualities which make for success in business. Whatever 1904 may haye done for the trade, or failed to do, there is no doubt that it set them to thinking with new earnestness and frankness in regard to many practical questions connected with the changing conditions under which business is transacted. While many of the great questions have not been settled, or even brought within sight of settlement, the fact that merchants and manufacturers are learning to look at them in this spirit is full of promise, for it indicates not only that the best thought of the trade will be given to their solution, but that those charged with responsibility in the direction of business enterprises are considering practical problems and general principles in a thoughtful, independent and courageous spirit, which cannot fail, whatever conclusions may be reached, to have a stimulating and generally beneficial influence in their deciding upon and carrying out their business policy. This spirit, apart from whatever substantial returns may have been received from 1904, should be recognized as one of its most valuable contributions for the equipment of merchants and manufacturers for the work of the new year.

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There are perhaps some houses whose affairs have been directed with so much wisdom and energy that there is little to desire other than a continuance of the same spirit and policy, attended as it doubtless will be with an enlarging field and increasing profits. Such houses, however, are the very ones which will enter upon 1905 prepared to avail themselves of the benefits of the experience of the past, and to modify methods, to adopt new measures and in one way or another to put into effect plans which are characterized by some new and perhaps original features, thus to illustrate anew the resourcefulness which is so largely the secret of success. It is safe to assume that in most houses there is opportunity for a breaking away from the restrictions of some old outworn method or tradition and for the adoption of a new spirit, in which invention and ingenuity, and a readness to learn from others and to get into sympathy and active touch with up-to-date methods, shall be coupled with enlarged enterprise, and with promptness, tact and energy in the conduct of business. In this view of the case, 1905 should not be simply another year, it should be A NEW YEAR.

During the past year the course of things has been to test the influence and permanency of combinations and consolidations, so many of which are operative in the Hardware or allied fields. The new year opens without any final determination of the limits within which the laws of trade and of human nature permit such methods for controlling price and production to be in the long run successful. So far as the Iron and Steel Industry is concerned it seems well assured that there will always be sufficient outside competition to hold the large consolidations in check and to prevent any real monopoly on their part. Until the sources of both production and transportation are controlled there will always be a place and a possibility for small factories well managed and properly located. The freezing out of such competition —like the self decapitation of the character in the comic opera—is both a difficult and dangerous operation, and the large aggregations after a good deal of experience have apparently settled down to a recognition of the permanence of the small competitor, who is to be treated with or fought with as circumstances may dictate. It is one of the interesting facts of business competition that the enterprising small manufacturer can often make the market price in a manner out of all proportion to the size of his product. The policy of ignoring the little man can only be successfully carried out in times when goods are scarce and demand exceeds supply.

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There have been plenty of attempts in the past on the part of manufacturers to control production, but so far it has simply resulted in bringing new competition into the field. So far as popular feeling is concerned it seems to be generally recognized that the idea of consolidation is a natural development of the times, and the thought is now toward regulation rather than elimination. The success of great consolidations has not, however, as yet been demonstrated. The evils of overcapitalization and of watered stocks have been so thoroughly exploited that any new promotions in this direction are not likely either to be successful or to catch the public napping. The general speculators and investors have a vivid remembrance of wounds scarcely healed, and, in the language of the "Street," "It will take some time to collect a new flock of lambs." The lesson has not been lost upon the consolidations themselves, for they are realizing that their success will be in proportion to the extent to which they run their affairs upon a business and not upon a stock jobbing basis.

## Condition of Trade.

The business situation as seen by representative manufacturers and merchants is described with especial fullness in the following pages. The views thus expressed refer to the following, among other features of the trade, as furnishing the basis for large and profitable business during the new year: The great income of the farming population from the large and valuable crops; the generally prosperous conditions which prevail throughout the country; the strength of the Iron market and the prospect for the maintenance for some time at least of relatively high prices; the liberal purchasing by merchants in preparation for an active business during the season; the absence of disturbing factors to interfere with the general well being; the strong position of the country financially; the large and increasing export trade, and the remarkable confidence in the future which animates the commercial and industrial classes and which must be an important factor in bringing about the realization of the hopeful anticipations which prevail. A perusal of

the letters thus presented will have, unquestionably, a tonic effect upon a market already confidently strong, and should contribute to the encouragement of enterprise and energy in the advancement of individual interests, with a view to securing a proper share of the prosperity which is apparently in store for the country and for the trade.

### Chicago.

Already at this date of writing a number of advances have been announced including those on Sheet Zinc, Galvanized Pails, Pans, &c., Tinware, Nickel Plated Ware, Copper Bottoms, &c. The trade is expecting advances on Wire, Nails, Pipe, Galvanized Sheets and many articles made from Sheet Steel and Bar Iron and Steel. Jobbers who have figured up the total sales for 1904 are pleased to discover that the aggregate is but little less than that of the previous year—and in some cases greater, in spite of the dullness of the first half of the present year. Large stocks are being laid in to provide for the newly awakened demand and in anticipation of advancing prices.

### Philadelphia.

SUPPLEE HARDWARE COMPANY.—This letter will reach the office of *The Iron Age* when the year 1904 has passed away and the bells have rung in the year 1905. The old year ended with seasonable weather and with good trade. During the last month it was evident from appearances that the general retail trade of our city had never been so great; never were so many goods bought, never so many presents given and perhaps never a more cheerful feeling existed than was shown in the faces of the crowds of people on our streets, which at times made them almost impassable.

During the past year we have seen various changes in the business situation; as a whole, however, we feel it has been a prosperous year. The export trade has surpassed any previous year in the history of our country, showing an excess of exports over imports of $470,000,000 for the fiscal year. While some of our agricultural products show a reduction in value as well as volume, the manufactured products exported have vastly increased. During the early months of the year our experience was that many manufacturers found it difficult to fill orders they had in hand as promptly as customers desired, while others, through perhaps improved machinery and additional force, were more fortunate. During this shortage of goods and with the high price of raw material there was no advance in prices of manufactured products.

Then came a later period when trade slackened somewhat and manufacturers found themselves better able to supply orders with but little delay. There was, however, no sign or general appearance of a pessimistic feeling, although it perhaps required nerve with the approaching election and depression in prices in the "stock market." Nevertheless even "frenzied finance" did not appear to frighten them, and as the year progressed encouragement took the place of uneasiness, and during the last two months there has been a fairly optimistic feeling and encouragement has reigned supreme.

During the past year we have seen less co-operation between manufacturers in combined agreements on prices than is usual during a similar period. Some suggest that this has been largely owing to the "break up" of what was called the "gentlemen's agreement" on the price of Single Barrel Guns, which agreement began the last days of 1903 and went to pieces soon after the celebration of Washington's Birthday following. The result of the "break up" took prices on Single Barrel Guns far below what they had ever been sold for, and about 50 cents less than manufacturers contended was the cost of manufacturing at the time of their co-operation or agreement. This, however, was nothing unusual, as we expect when prices go to pieces as they did they will go far below any level they have reached before, largely owing, we presume, to the bad feeling which exists at the time of the "break up;" some one or more being accused of violating the agreement, hence the disposition of some of the others "to pay them back in kind." Where no money is invested by persons forming an agreement to restrain their actions, and there is a "break up" or forfeiture of confidence, we usually expect prices to go lower than they were, regardless of cost, prior to the agreed prices.

The Axe combination exists with all its vigor and the Hatchet combination likewise, and they are quite likely to exist during the year 1905, perhaps longer; the latter depending largely upon any growing disposition to advance prices further, which may frighten the trade. In cases of this nature jobbers are liable to starve their stocks, retailers to buy sparingly and the consumer to postpone buying. We do not mean to infer by any means, however, that their prices have reached that point.

At the present time we feel there is every indication of a good trade for spring. Manufacturers of Bessemer steel and pig iron have their furnaces in full operation with likely an increased output. Manufacturers of iron, Barbed Wire and Wire Nails are all more than busy with a reported heavy export trade. Railroads are getting out large contracts for steel rails; they are also getting out orders for engines. Orders for many hundreds of these have been given out within the last 40 days, and the presidents and managers of the railroads of our country usually know what they are doing; it is not often they make a mistake in their surmises or anticipations. The agricultural producers of our country have been blessed with bountiful harvests. The wheat crop of 550,000,000 bushels, a trifle less than the previous year, will most likely bring in far greater financial results, or in other words a larger amount of actual cash. The corn crop of over 2,000,000,000 bushels will also bring in greater returns than the previous year.

The cotton crop of our country, now estimated at 12,500,000 bales, is far in excess of anything known in the history of the country, and when we say this it means the world. When the estimate of 10,000,000 bales was made the price of cotton was 10 cents, and would likely have remained about that, but with no plan in existence to sustain the market the prices dropped fast as the knowledge of a greater record crop developed. The closing of the New England cotton mills during the past five months, owing to the strike for higher wages, has temporarily diminished the requirements of the mills in that location, and, unfortunately, like a break in price of some particular stock in the stock market, the bears get control, fears join in the issue and down, down prices go unless capital comes to the rescue.

There is one consolation, however, but that unfortunately cannot help immediate conditions. As a rule we find that low prices caused by estimated overproduction extend the uses of that product in various ways and manners. Thus as time passes we find that the actual requirements of the world are greater than they were when higher prices existed. The South, however, is in a good condition and the present price should open all the cotton mills in the South, and it is quite likely no unemployed person will remain idle for lack of opportunity to work.

We take this opportunity of wishing the editors of *The Iron Age* and the patrons of the paper a Happy New Year, and may health and prosperity be their lot for the year 1905.

### St. Louis.

NORVELL-SHAPLEIGH HARDWARE COMPANY.—The subject of conditions at the opening of the new year is so big that we will only attempt to touch upon one or two phases. Great corn crop, good wheat crop, immense cotton crop and plenty of everything else. High prices, except for cotton. Poor planters sold early and secured high prices. Rich planters already having money will not seriously suffer. Southern salesmen do not believe present price of cotton will greatly check spring business. The man with the hoe is surely on top. Business is bound to be good, but of course the fruit will not fall unless the tree is sufficiently agitated.

The jobber is up against an ever increasing expense account. The retail dealer wants quick shipments, prompt answers to his letters, no shortages, no errors. The jobber must give good service. Good service is expensive.

Isn't the retail dealer often willing to insist upon such service and then by some petty claim show his utter lack of appreciation? The president of one of the great railway systems recently made a very striking report upon the increase of claims. Such statistics make every thinking business man stop and consider. Especially in prosperous times are we not inclined to overlook the character of the claims, deductions, rebates, returned goods, &c., that eat into our profits? The claim department is often left in the hands of inferior clerks, when, in fact, it is one of the most important parts of the business. A study of claims reminds one of the problem in arithmetic, "If a frog is at the bottom of a well 100 feet deep and daily jumps up three feet and falls back two, how long will it take him to reach the top?" A good resolution for the new year is to give the claim department some personal attention.

Our geographical location between the North and South, the East and West, gives us exceptional opportunities to study trade and compare the conditions in various situations. It is also interesting to seek the causes that bring about certain effects. In a certain part of territory, we are thankful to say only a small part, the local jobber idea is sadly overdone. In such sections big jobbers, local jobbers and retailers are engaged in a cheerful game of "dog eat dog," with its side dishes of bitterness. Electric cars make lightning change artists of would be salesmen. Retailers are drummed to death and take in the "snaps" offered by Tom, Dick and Harry. They are loyal to none. Orders are small, first-class salesmen drop out and cheap boys take their places.

In the struggle for existence the jobber-retailer not only sells all kinds and conditions of dealers, but his salesmen also drum up blacksmiths, manufacturers, hotels, gun clubs, farmers and consumers of every nation. In order to compete the merchant doing retail business seeks the manufacturer and buys more than he needs. Jobbers give their "infantry" actual costs and beg them to be merciful. At last in desperation they turn to the manufacturer and pray for succor from themselves and their kind by the cure-all of controlled prices. Such conditions will not be cured by good crops; they will but prolong the agony. A series of bad years must come to clean up by the hard process of elimination.

Much has been said in the press of late about the development of the local jobber. It seems to me only one side of the question has been considered. The advent of the local jobber has been heralded in certain sections by brass bands and flying flags. He was to take away the business from the large jobber at a distance. How often has he disappointed such hopes, and, instead, existed by taking only the local retail business!

The retail dealer has awakened to find he has nourished an "old man of the sea" to ride upon his shoulders. Many retail dealers who by economy and close personal attention to their business have made and accumulated money are considering the advisability of branching out into the jobbing business. Many allurements are held out. "Jobber" looks well on the letter head. The manufacturer hints at mysterious jobbers' lists and extra discounts. In some cases no doubt it may be well, but the local jobbing idea has wrecked many a good retail ship. The best trade will be hard to get. Then they will give you the unprofitable staple business. Man cannot live on Nails alone.

You must remember that the large jobber is well satisfied with 3 per cent. net on his sales; he has the advantage of trained specialists and expert work in every department. You will find it takes a great deal of money to keep stock complete and carry accounts. You will probably borrow at home and pay home rates. The large jobber will get his money at 2 to 3 per cent. less than you, and on this one item of interest alone can sell goods at a profit where you are selling at cost.

Therefore it seems to me that the retail dealer who has the jobbing bee in his bonnet at the opening of this new year should feel his way very carefully. All who are familiar with conditions in this country will certainly admit that retail dealers best flourish in those towns and sections where the many pronged fork of the local jobber is not in use.

## Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—We believe that we voice the opinion of the majority of the Hardware jobbers in saying that the year 1904 did not go down into history as a banner year either in point of sales or net earnings. While the trade have seen much worse years than the one just closed, the majority of them have no doubt occasionally enjoyed better ones. Owing to the high price of cotton during the greater part of the year and the wonderful improvement and development that have taken place in the South in all lines it is probable that our Southern friends have had a greater degree of prosperity than those of any other section.

One of the hardest things that a jobber, or a retailer either, has to contend with is a steady and gradual decline in the price of his goods, and this was the condition that existed in the Hardware trade for nearly the entire year. The months of January, February and March in point of sales were very satisfactory, but from March to October sales showed some falling off. The decline in prices on all kinds of Hardware, while not radical or heavy at any one time, was continuous. In the summer a sudden decline of 20 cents per hundred on Nails, Wire and other similar products had a bad effect upon the market and business generally, and this state of affairs lasted until the latter part of October, when a decided reaction began to take place. The business of October, November and December was beyond question the best of the entire year. The natural demand for goods was heavier, the advances in prices were most wholesome and not at all unreasonable; consequently the sales for those months showed an increase over 1903, and we have no doubt that the net earnings of both jobbers and retailers for the last three months of the year were very satisfactory.

Another thing that probably had more or less to do with business conditions was the fact that it was the Presidential year. Notwithstanding that the newspapers and business people continually reiterated that the election was not affecting trade, now that it is all over with we are of the opinion that it did affect it to a considerable extent.

The year 1904 was a very satisfactory one to the jobbers' credit departments. Collections were good every month, and the inclination on the part of the trade to discount their bills was more evident than ever before, and it seemed to take less dunning to get money from slow accounts than usual. This company's bad debts were the smallest we have ever known in proportion to our sales. The latter part of November the sudden and heavy decline in cotton took place, and this to some extent curtailed collections.

The past year has been one of progress and improvement for the Hardware jobbers. New and profitable lines of goods have been added to their stocks, dead ones have been cut out. Many of the large jobbers are taking the entire output of factories in some lines, and some few jobbers are operating factories themselves. Especially is this the case in the saddlery line. A number of prominent Hardware jobbers who have a large saddlery trade have found it necessary to operate their own saddlery plants, and the venture has proven to be a very successful one.

Now, as for 1905, we are not going to make a great many prophecies; we believe, however, that it will be a good year with the Hardware trade. The merchants of the South are in good shape. They are more up-to-date than ever before. They are alert, progressive and wide awake. They are carrying larger and better assorted stocks. They are selling on shorter time and collecting closer. They are running their business upon business principles. Southern people are just beginning to realize what a wonderful country they have. The climate is mild and pleasant in the winter and no hotter in the summer than the Northern country. The soil is fertile to a wonderful degree and will produce almost every kind of crop known, and a large part of it will produce as many as three crops a year. Rich iron and coal beds and other minerals are abundant.

There are millions of acres of magnificent forests. New railroads are being built in all directions. Manufacturing plants are being established everywhere. The South is bound to be a wonderful and prosperous country no matter what happens. Just at this time the decline in cotton is somewhat of a setback and is causing considerable discussion, but the Southern planters can raise cotton and make a good profit on it at the present prices. The principal trouble is that it is a little hard to become reconciled to these prices when they have been used to such high ones during the past year.

### Baltimore.

CARLIN & FULTON.—In reviewing the year 1904 the historian who takes cognizance of all that pertains to this nation's development, whether in the increase of its agricultural products, the growth of its manufacturing interests or the spread of its foreign commerce, must recognize the great importance of the Hardware trade as a factor in every occupation followed by man and in every kind of business transacted, whether local, interstate or international.

The productions of Iron and Steel, as announced weekly in the columns of *The Iron Age*, are of a magnitude almost incredible, and yet are but the basis on which rests a still greater commerce, that of the manufactured products, which in their production and distribution call into play the genius of the inventor, the skill of labor, and the mighty forces of capital and business energy whose results are seen and felt the wide world over.

It is a great tribute to the importance of these industries that, beginning with the days of Tubal Cain and keeping pace with the world's progress, they are to-day regarded as the barometers by which to measure the atmospheric conditions of the business world and to prophesy future calm or mighty storm.

The year began auspiciously. The demand for heavy staples, such as Wire and Nails, resulted in moderate advances in prices, and in some lines we saw strengthened the consolidation of interests which had formerly competed with each other to the detriment of their stockholders, and whose combinations in the year preceding had been rather of an experimental nature. Spring business as a general thing was remarkably good, especially so in the South, where the high prices for cotton had put an immense amount of money into circulation; but after the spring business had ended and prior to the Presidential election there was a hesitation or uncertainty in the great manufacturing centers, and in some lines there was a tendency toward weakness of price, which reached its maximum during the summer.

The pessimism as to business during a Presidential election year was of short duration, and good crops, which are synonymous with good trade, gave an impetus to business, which was also aided by the equanimity with which the results of the election were accepted by all sections of the country without regard to political creed or preference, and also the belief of our capitalists that the national finances are now on a sound and permanent basis.

We have great hopes and confidence in the business of the year 1905. The only unsatisfactory feature at present is the low price of cotton, but the price per pound must be multiplied by the greatest crop perhaps ever known, which means business for thousands of spindles which otherwise would be idle, and also that the transportation lines of the country will be taxed to their utmost.

The business also booked for 1905 by the great Iron and Steel producers of the country has changed the whole tone of the market, and every day announcements are made of the withdrawal of old quotations and the substitution of new and higher prices. The changes are not radical but conservative and based, we think, very greatly on legitimate demand and supply.

The great questions which are to be taken up as outlined in the President's message may have in the future some effect upon the methods of business and the resulting prices, but these are matters for the future. There may be a time when the shipments of all goods will not originate theoretically at Pittsburgh, no matter where the factory be located, and the question of combination or association of competing factories to regulate prices may be a matter for legislation, and will undoubtedly be an opportunity for discussion.

In this letter we have not discussed in detail prices, which are familiar to all who read your current quotations. We have merely endeavored to give an idea of business conditions and are glad to call attention to the fact that bank clearings are not always the true exponents of business conditions, as "frenzied finance" may magnify through stock transactions the trade of any city without adding one dollar to its legitimate business. The true exponents of trade are the railroad earnings, which show the tonnage moved; the bank deposits, especially savings banks, indicating the employment of labor, and the receipts of the custom houses, showing the activity of foreign commerce, and in all of these particulars there is hardly a city in our whole country which has not progressed during the year just ended.

### Louisville.

BELKNAP HARDWARE & MFG. COMPANY.—The close of the year brings certain elements of quiet with it which have their effect even upon the Iron and Hardware markets. Buying for the past two months has been so very active that it is only fair to expect a moderate reaction at least in activity. Prices are extremely firm, with advancing tendency, and contracts are being made well into the next year wherever they can be placed.

Some manufacturers freely predict a shortage of Pig for the coming year, based on the idea that the furnace productive capacity of the country is not large enough for its full demand; still, there are some large mills which have been unwilling to load up at the lower prices that may be seeking a market after January 1. These, as far as we can learn, are well provided with raw stock and scrap, and may cut quite a figure when they once come forward with their offerings.

It makes a great difference whether the people believe the climax to have been reached or whether there are more advances in sight. There are some that believe that the continued increase in the world's supply of gold is responsible for higher prices for all manufactured products, and with ordinary fluctuations that these will be permanently higher than the average to which we have been accustomed.

In any event the outlook is promising, and the pessimist has a pretty hard time to get a hearing. The building outlook in our own city and surrounding country is unusually flattering. While of course the totals would seem small for a larger city, where outside capital is furnished freely, at the same time by comparative figures we are pretty well satisfied that we shall have a year of steady employment and liberality in investments, all of which augur well for business.

In the coming year there are some interesting questions likely to arise such as have already been propounded; for example, as to the Governmental regulation of all corporations doing an interstate business; possibly a test of the trusts under the antitrust laws. These are business propositions that will prove more entertaining in the halls of Congress than the race problem or matters of that kind which have heretofore engaged the attention of our politicians.

One thing the business world can unite on, and that is the simplification of our postal charges. While the writer has never been an advocate of 1-cent postage as applying to the entire country, believing that the Department should be as near as possible self supporting, we have believed and urged upon our Representatives the desirability of 1-cent postage for first-class matter within the limits of the city where the letter is mailed. This would lead, we believe, to a much larger increase in the use of the mails for the distribution of statements, bills, circulars, receipts, &c. A simpler classification of printed matter as to postal charges is greatly desired. Also the developments of the parcels post arrangements with foreign countries is something worthy our attention.

Certainly we have much to be thankful for in the year just closing—great commercial activity, comparatively few labor disturbances, a tendency toward the peaceful

solution of international disputes and a fair adjustment by the courts of those within our own borders.

While we are writing this news comes of premeditated incendiarism in Georgia of hundreds of bales of cotton. Such a great voluntary sacrifice to the god of Mammon we have never heard of before. We believe it must be unprecedented in the world's history. The idea that wealth is made by destroying wealth should be out of date in this age of the world. This cotton might have been stored, it seems to us, for another year and smaller acreage put in. At any rate the labor of raising and gathering bestowed on this certainly reaches a large sum of money in actual realizable cash value. It raises the question of the propriety of the Government report at a time when it is most damaging. If the market had been left to itself this year it would have settled gradually and the real holders of cotton apt to be less damaged in the end than they have been by the violent fluctuations which have come about as a result of misrepresentation and false statistics. But of late years the crop has been more diversified, and planters cannot be as badly off as they would have been in the old days when cotton was their sole dependence.

### Portland, Oregon.

CORBETT, FAILING & ROBERTSON.—The year drawing to a close has amply fulfilled the prediction we made for it in December, 1903. It has been one of disappointment to the optimist and at the same time the pessimist has not had his full innings. The farmer—after all, the backbone of the country, and on whom we depend for our prosperity—has, in different sections of the Pacific Northwest, met with failure and success in the various branches of his calling. Some sections that usually have ample moisture and to spare have had a dry season, while others that more often are too dry have had bounteous crops.

The territory given over to cattle ranges probably has suffered more than any one industry, as it has been carrying two years' increase on ranges, being unable to sell owing to no demand. Next in the tale of woe comes the timbered sections, where hundreds of saw and shingle mills have shut down, owing to slack demand and low prices for their products, consequently closing logging camps and throwing thousands out of employment.

Finally, on that side of the ledger come our mining interests, an industry that sooner or later will lead all others, that have met with serious setbacks, owing probably to the boomers who have foisted so many worthless properties on a confiding public in the past years, through enormous capitalization, whose stocks they sell at 3 to 5 cents a share, promising Calumet and Hecla returns on investment. This bunco game will be called to account very largely by our corporation tax, which hits these impecunious boomers where they live, as they cannot produce the wherewithal to get their start.

On the credit side looms up high prices for hops, wool and grain; as to whether they offset the drawbacks we will have to postpone judgment until we pass on business at the close of 1905.

The coming year should mean much to the "Oregon Country," as it was known 100 years ago, from Montana to the Pacific Ocean. Here in Portland we shall celebrate the centennial of the coming of Lewis and Clark by holding an international exposition, the success of which is already assured so far as a picturesque location, appropriately designed and well constructed buildings with overflowing exhibits can contribute. The management has already had to provide several additional buildings and has enlarged the scope beyond that as first planned, at the same time only culling the St. Louis exhibits, both Government, foreign and domestic, on account of lack of space.

Through co-operation of transcontinental railways low rates have been named for round trip, and with inducement of an unrivaled summer climate, as we are in the same latitude as Montreal, we expect an influx of visitors that will thoroughly investigate advantages of investment and residence throughout Montana, Idaho, Washington and Oregon, overflowing into California.

For years we have courted this investigation, knowing full well ourselves that ours is a country overflowing with wine, milk and honey, and we want these advantages known from Portland, Me., to Portland, Ore., so that the *effete* East may send to us of the bounding West more of that virile manhood that has in the past done so much to help us develop our latent resources and industries.

To promote the work being done by man to help himself, as above outlined, nature is standing in. Oregon's winter wheat crop in last Government bulletin tops every State in the Union with an average of 97. As a forecast of what we hope the new year has in store for the Pacific Northwest and as tending to show a turn in the tide, we can state that in our own individual case December is the only month in the year, except February, to show as increase in volume of sales over corresponding month in last year.

### St. Paul.

FARWELL, OZMUN, KIRK & CO.—In the closing days of 1904, as we look backward, we realize even more fully than we did when the events were occurring the fact that it has been a year of more than the usual number of close calls and narrow escapes, and yet that, with them all counted in, it has been on the whole a favorable year.

It has been a year of floods in some parts, of droughts in others; of serious danger from frosts, actually realized in certain sections; of blight to the wheat crop in parts of the Northwest; and still the country as a whole has been prosperous, and it starts in the new year with favorable prospects and with the feeling general of confidence and enthusiasm in the future immediately before us as strong as we often find it. A limited area of country is suffering from loss of crops, but this applies to less extent than usual and it requires only another good crop such as those sections usually have to bring them up again into good shape. One of the greatest causes of surprise in the history of the development of the country has been the rapid recovery in all sections from the serious setbacks that may have overtaken them. There was only a short interval between Kansas "poverty stricken" and Kansas on the high road to prosperity, and the same is true of the country as a whole. Only a few turns of the wheel of fortune and it is done, and all that is necessary to win out is for the man to stand by his guns and bide his time.

The South may suffer temporarily from the low price of cotton, but the cure will be duly worked out without any such exhibition of "frenzied finance" as that of burning cotton.

It is a very favorable symptom in the Hardware trade that prices are generally firm. Merchants can lay in their stocks for wants with the feeling that prices are likely to continue strong. This feeling will stimulate trade, while there is no danger of its leading to speculation. Nor is it probable that manufacturers in any line will force prices temporarily so high as to invite early or serious reaction.

It now promises that the business of the first half of 1905 will equal that of any preceding corresponding period, and with fair returns from the next harvest assured a good year's business can be depended on. The business interests of the country have probably never been on as solid a basis as they now are and they promise to grow stronger as the years go by.

### San Francisco.

PACIFIC HARDWARE & STEEL COMPANY.—At this annual season of stock taking we frequently hear the hope expressed that the results will prove that the year nearing its completion has been a most profitable one. On this point there seem to be occasional expressions of doubt, particularly in the Hardware line, on account not only of the considerable fluctuations in the market, which for the greater part of the year had a downward tendency, but perhaps more particularly on account of the rather unusual severity of the competition that has existed throughout the entire year among local houses.

It is not unusual during times of declining prices to observe that competition is more keen than ordinarily, induced probably by the determination of all to rid them-

selves of a stock on hand before another decline takes place. Our unusual severity of competition was probably influenced by other causes as well, of a more or less local nature, and which we hope to find minimized or entirely eliminated in the coming year.

Business generally on the Pacific Coast has been in a most prosperous condition, with the exception perhaps of the lumbering districts in the North and occasional scattering farming sections in which crops were not up to the standard. At this season it is difficult to estimate if conditions as to these sections will be any different during the coming year; the lumber business being dependent on so many influences and the crops altogether subject to weather conditions from now on. We in California are in the midst of our rainy season, which up to date has been rather a dry one. We, however, have heard no loud and strenuous complaints from the farmer and so must judge that he has not been hurt, and must place our hope in the immediate future to make up for any shortage of rain to date.

We look forward to the year 1905 with much hope. The outlook promises a much better market, and we anticipate a steady or perhaps even an advancing market to overcome some the troubles of last year. The volume of business in the Hardware line on this Coast is steadily increasing; we believe not so much on account of the increased demand, but principally on account of the competition that now exists among the Pacific Coast jobbers, which keeps the business at home where it belongs and has tended to build up not only the jobbers, but the retailers as well.

### Cleveland.

THE W. BINGHAM COMPANY.—Well, Christmas, with all its joys and pleasures, has passed, and we hope the "reindeer express" stopped at the homes of all our friends and delivered many gifts, for if the many Skates, Sleds, Pocket Knives, Carvers, Scissors, Shears, Razors and almost innumerable other articles that our customers purchased of us for the holiday trade have been distributed, surely many persons have had a very Merry Christmas.

In looking back over the trade we have enjoyed during the past year we feel very grateful to the many thousand customers who have favored us with their repeated orders, we suppose on account of the favorable prices and good service we have sought to render them. We enter the new year confident that a greater volume of business will come to us all. Why? Because we all deserve it.

It is said: "All good things come to him who hustles while he waits." Well, we have always hustled and now wait impatiently for the promised reward, and we shall in the future as in the past render to our friends and customers the best service we can give. Try it, and be convinced. After more than 60 years of constant service in the harness, we are grateful for the many favors received at the hands of our customers and friends.

Nineteen hundred and five bids fair to be a record breaking year in the way of business. Many lines of goods are now cheap, if the cost of raw material and labor and cost of doing business be considered at all, and we say buy at once many lines of goods; take them into stock and be ready for the business that will be offered you.

Plain and Fancy Wrought and Cast Butts, Strap and T Hinges, all kinds of Bolts, Screws, Files, Carpenters' Tools, Builders' Hardware, Factory, Mill and Mine Supplies—in fact, all kinds of Hardware—are cheap at present prices.

We wish you all a very Happy New Year.

Well, "Here's to you all! May you have many prosperous days and very few lean ones!"

### Boston.

BIGELOW & DOWSE COMPANY.—Reviewing the results of the past year and comparing them with the opinions as expressed in *The Iron Age* of January 7, 1904, one is impressed with its truthful forecast and may look to the present issue for valuable information as a guide for the new year that is before us.

In the beginning of 1904 conservatism was the rule in buying, every one looking for a lower range of prices, but it came so gradually as not to disturb the volume of trade, which compared favorably with other years. In midsummer prices were at the lowest level, but values have gradually increased since that time until they are now higher than at the beginning of the year. Confidence in the future has influenced free buying, and the Hardware dealers have a golden opportunity to make good profits if they base their selling prices on the current market rather than on their costs.

The business future in New England looks brighter than it has for many a day. Except in Fall River the mills are running full with an assured sale for their production. The boot and shoe industry is astir. Building interests are improving, and the architects have plans in progress which will show quite a boom in the near future.

The policy adopted by the American Steel & Wire Company meets the hearty approval of the trade. The sale of its products in this market for the last 30 days was never greater. The year closes with bright prospects in the near future. All extend New Year's greetings to *The Iron Age*, and hope it will prosper in the future as it has in the past.

## NOTES ON PRICES.

**Wire Nails.**—The activity in the market continued unabated until the close of the year, and mills are well supplied with orders for the coming 60 days. There is not much doubt that orders will continue to be received, at least until another advance in prices is announced, the trade having the feeling that it is not likely to be long deferred. With the volume of business thus accumulated at the mills it will not be surprising if the shipment of some orders is delayed beyond the 60-day limit. The violent storms of the past week or more are likely to increase the difficulty experienced by the railroads in making prompt deliveries. The increased cost of raw material is causing mills who buy their supplies to prefer not to accept orders at present prices. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

| | |
|---|---|
| Carload lots to jobbers | $1.75 |
| Carload lots to retailers | 1.80 |

*New York.*—The carload business done by jobbers during December was largely in excess of the corresponding period last year, owing to the almost universal action on the part of dealers to cover requirements before further advances went into effect. Merchants who placed 60-day contract orders, with the request that shipment be delayed, are now requesting shipments as early as possible. Current demand is light and probably will continue so until the middle of the month. The market is firm at the following quotations: Single carloads, $1.94½; small lots from store, $2.

*Chicago, by Telegraph.*—Mills are well filled with orders, and the present activity comes from efforts of buyers rather than sellers, as further advances are looked for in the near future. Prices are held firmly at $1.90, base, in car lots to jobbers and $1.95 to retailers, with 5 cents extra for less than car lots from mill.

*Pittsburgh.*—We note a fairly active demand for Wire Nails, but as yet there has been no change in official prices with the exception that one of the leading independent mills is holding Wire Nails at $1.85, Pittsburgh. Jobbers are placing fairly large contracts for shipment within 60 days, in view of the expected announcement of an advance in prices, which may come at any time. We quote Wire Nails in carloads to jobbers at $1.75 and in less than carloads at $1.80, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. off for cash in 10 days.

**Cut Nails.**—Considerable activity still exists and is manifested by the volume of business which has been placed with the mills. Should an advance be made in the price of Wire Nails before the next meeting of the Cut Nail Association Cut Nails would be advanced to par with Wire Nails without the formality of calling a meeting, as was the case when the last advance occurred. Quotations

are as follows: Carload lots, $1.75; less than carload lots to jobbers, $1.80, and to retailers, $1.90, f.o.b. Pittsburgh. Iron Cut Nails, for delivery at Pittsburgh, Buffalo, and all points west of these cities, 10 cents advance per keg on Steel Nails.

*New York.*—The same conditions that have stimulated the demand for Wire products have affected the volume of business in Cut Nails, but of course in a smaller degree. Local demand is now light, but the market is firm. New York quotations are as follows: Carloads on dock, $1.89; less than carloads on dock, $1.94; small lots from store, $2.

*Chicago, by Telegraph.*—Prices are firm and trading active. Official prices are as follows: $1.90 for car lots to jobbers, $1.95 in car lots to retailers, with 5 to 10 cents advance for less than car lots from mill, according to character and size of order.

*Pittsburgh.*—The holiday week has been rather quiet, but a fair amount of new business is being placed for Cut Nails, but not quite as heavy as before the recent advance in prices was made. Some of the jobbers anticipated this advance and placed liberal contracts before it was made, and are therefore covered for some time ahead. Prices are quite firm, and we quote: Carloads, $1.75, base; less than carloads to jobbers, $1.80, base; less than carloads to retailers, $1.90, base, plus carload rate of freight to point of delivery; terms 60 days, less 2 per cent. off for cash in 10 days. Iron Cut Nails for delivery at Pittsburgh, Buffalo and all points west of these cities are 10 cents a keg higher than above prices.

**Barb Wire.**—The volume of orders booked by the mills will keep them fully employed for some time. The market is exceedingly firm and quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

| | Painted. | Galv. |
|---|---|---|
| Jobbers, carload lots | $1.90 | $2.20 |
| Retailers, carload lots | 1.95 | 2.25 |
| Retailers, less than carload lots | 2.05 | 2.35 |

*Chicago, by Telegraph.*—Independent mills are hoping for advances in the near future in all Wire products, as the present high prices of Wire Rods and Billets make profits problematical to the mill that cannot control its raw material. Present official figures in car lots to jobbers and large retailers at Chicago are as follows: Painted Wire, $2.05; Galvanized, $2.35; retailers, car lots, 5 cents higher; less than car lots, $2.20 Painted; $2.50 Galvanized. Staples, Bright, $2; Galvanized, $2.30.

*Pittsburgh.*—Tonnage in Barb Wire being placed with the mills is larger than usual at this season of the year. Announcement of an advance in prices by the leading interest is expected at any time. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

| | Painted. | Galv. |
|---|---|---|
| Jobbers, carload lots | $1.90 | $2.20 |
| Retailers, carload lots | 1.95 | 2.25 |
| Retailers, less than carload lots | 2.05 | 2.35 |

**Smooth Fence Wire.**—The probability of a further advance in price causes a continuation of buying. The market is firm in tone and quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

| | |
|---|---|
| Jobbers, carloads | $1.60 |
| Retailers, carloads | 1.65 |

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

| | 6 to 9 | 10 | 11 | 12 & 12½ | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|
| Annealed | Base. | $0.05 | .10 | .15 | .25 | .35 | .45 | .55 |
| Galvanized | $0.30 | .35 | .40 | .45 | .55 | .65 | 1.05 | 1.15 |

*Chicago, by Telegraph.*—Buyers are anticipating their wants as far into the future and in as large tonnages as mills will permit at present prices. The tendency among independent mills is to book as little tonnage as possible before the advance that is looked and hoped for. There is little temptation to shade official prices, which are $1.75 for base sizes of Annealed Wire in car lots to jobbers, $1.80 in car lots to retailers, with 5 cents extra for less than car lots. Galvanized Wire maintains its regular extra of 30 cents over Annealed.

*Pittsburgh.*—Demand continues quite active, more so than usual at this season of the year and is probably due to the fact that the trade expects an advance in prices at any time. As noted last week, a leading independent mill has already advanced prices $2 a ton and is said to be securing a fair amount of tonnage at the higher price. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

| | |
|---|---|
| Jobbers, carloads | $1.60 |
| Retailers, carloads | 1.65 |

**Shovels and Spades.**—The manufacturers of Shovels agree in anticipating a large volume of business in 1905, but the condition of this line of goods so far as prices are concerned is far from satisfactory. The competition which exists is very animated and makes it difficult for the manufacturers to advance their prices, as should be done in view of the higher prices ruling for the raw material. It is not unlikely, however, that it may be necessary for higher prices to be announced, but there is certainly no indication of anything like a general advance or of concerted action in the marketing of goods.

**The Andrew B. Hendryx Company.**—Owing to the advance in the price of metals and other materials entering into the manufacture of its various lines, the Andrew B. Hendryx Company, New Haven, Conn., announces the withdrawal of all quotations extended prior to the 20th ult. No contracts for future deliveries at a fixed price will be made by the company or its representatives during the period in which materials continue to advance.

**Hatchets.**—There has been an advance of 5 per cent. in the price of Hatchets, the discount having been advanced from discount 40 and 12½ to discount 40 and 7½ per cent. There has also been some change in the rebate to jobbers.

**Screen Wire Cloth and Poultry Netting.**—This is a line which feels the effect of the advances which have recently taken place in the price of Wire, but this is apparently not to the advantage of the manufacturers, owing largely to the fact that a large portion of their output was contracted for on the basis of prices for Wire ruling several months ago. The large trade have been purchasing very freely and contracts are generally considerably in excess of those of last year, while the specifications already in hand are very materially larger than a year ago. The situation is rendered less satisfactory owing to the fact that jobbers are selling the goods at exceedingly close prices, certainly without adequate profit, and in many instances at figures which must involve actual loss. It would improve the situation materially if this cutting were discontinued and reasonable figures maintained. Manufacturers naturally are unwilling to accept further orders except at an advance beyond the price made a month or two ago, and in view of the general conditions the opinion is expressed that it is very likely there will again be a shortage of both Wire Cloth and Poultry Netting.

**Sheet Zinc.**—Another advance has been announced in Sheet Zinc under date of the 30th ult., the price being $7.25 per 100 pounds in 600-pound casks, f.o.b. mill, subject to the usual discounts for cash and quantity.

**Rubber Goods.**—Not only did the raw materials used in the Rubber industry reach the highest prices on record during the latter part of 1904, but the average cost of such materials during the year was much greater than in any previous period of the same length. At the end of November fine Para Rubber sold in New York as high as $1.33 per pound, marking the climax of a gradual progression from 60 cents for Rubber of the same grade in the summer of 1889. While there have been many intermediate fluctuations, fine Rubber has never sold so low as 60 cents since, and the normal average for Rubber today may be regarded twice as high as 15 years ago.

Whatever may have been the effect of temporary speculative movements it can be stated as a broad fact that the predominant tendency of the market has been due to a more rapid growth in the demand for consumption than in the production of the material. At this date the best grades of Rubber are quoted at 10 to 15 cents below the extreme prices of November, but in view of the stimulation of the Rubber Shoe industry by the exceptionally

heavy snows already experienced this winter, and the fact that the apparent production of raw Rubber during 1904 was slightly below the average, it need not be surprising if the record prices should again be reached and even surpassed before summer. The question of Rubber prices has been mentioned in this detail as having a bearing upon the cost of manufactured products, the selling prices of which appear likely to be advanced. At recent conferences of manufacturers of Mechanical Rubber goods the need of an advance has been freely admitted. How to attain it is another question. The conditions of the industry are so varied in different important factories that absolute concert of action is not easily arrived at. For example, while one factory may work on Garden Hose as a staple product, in another this class of goods may be produced to fill in odd times, for which reason the manufacturer may be willing to sell his output practically without profit.

All that has been done thus far, however, has been the withdrawal of quotations by some leading concerns, with a view to making gradual advances, and in such cases the smaller operators generally follow suit. On January 1 the new list on footwear issued by the United States Rubber Company showed practically no change from last year, but this is due to the fact that this gigantic corporation was able some time ago to cover its requirements in Rubber far ahead and to fix its prices accordingly, whereas most other manufacturers buy only to fill their immediate wants, so that the actual cost of goods to-day may be much greater than when a contract for supplying them was entered into.

Next to Rubber the most important raw material of course is cotton. The decline in this material which has occurred of late cannot be reflected at once in the price of Rubber goods, for the reason that most large consumers in the Rubber industry made contracts for supplies ahead before the extent of the new cotton crop was realized. During December the leading Rubber manufacturers in England made a definite agreement for advancing selling prices, and steps to the same end were taken by the Rubber Manufacturers' Association in Germany. No precisely similar association exists in this country, and any advance made must be a matter of treaty between buyer and seller in each separate transaction. In spite of the high prices of Rubber during the past year the imports for consumption have been larger than ever, both here and in Europe, which indicates to what an extent Rubber has become a necessity in modern industries. Air Brake Hose, Belting, Motor Tires, Horseshoe Pads, Steam Packings and Rubber Shoes will be demanded, without regard to cost, and the problem of manufacturers is to adjust their selling prices to the expense of production.

While the Hardware trade therefore need not be surprised at being asked more for Rubber goods in the near future, the consoling fact exists that, in spite of any impression to the contrary, the Rubber industry is not controlled by any trust, and the higher the cost of goods the more keen competition in selling will be found. A general price agreement among the makers of solid Rubber Tires, made on September 1, 1903, did not prove satisfactory enough in operation to be renewed at the expiration of a year. During the past month a serious proposal was made toward a selling agreement on Air Brake Hose, but the refusal of one manufacturer to adopt it put an end to the movement. And other examples could be quoted to show that an open market exists for most lines of Rubber goods.

The great Rubber Shoe corporation mentioned above, instead of controlling the market, is obliged to consider a very formidable competition in fixing the prices of its products, and it approaches more nearly to being a trust than anything else the Rubber industry in this country has ever known.

**Rope.**—Business has been quiet during holiday week, as it was the week previous. Jute Cordage has had the most active call, after which Sisal has been the most popular. Manila Rope is quiet. Since the opening of the new year inquiries have been received by manufacturers, together with some orders, but for some time stock will accummulate in maker's hands. The market has a firm tone and excellent demand is anticipated for the coming season. Quotations are as follows: Pure Manila, 11¾ to 12 cents; Mixed Manila, 10 to 10¼ cents; Pure Sisal, 10 cents; Mixed Sisal, 8 to 8¼ cents per pound.

**Binder Twine.**—While the low prices announced by the Harvester Company the middle of December, 1904, did not result in a rush of orders, the omission of guarantee led some merchants to believe that prices might be advanced and that it would be policy to place orders at once covering their probable requirements. It is understood that quite recently an independent mill desired to have its price-less orders canceled by some of its customers on the ground that prices were too low in comparison with that of Sisal fibre. Sisal declined after Twine prices were announced, and the market will largely depend upon the future price of Fiber. It is probable, however, that a considerable variation in the prices of Fiber would have to take place before it would necessarily affect the Harvester Company's schedule, which is as follows:

| | Per lb. |
|---|---|
| Sisal | 9½c. |
| Standard | 9½c. |
| Standard Manila (550 feet) | 10½c. |
| Manila (600 feet) | 11½c. |
| Pure Manila (650 feet) | 12½c. |

Five-ton lots, ⅛ cent less; carload lots, ¼ cent less, Chicago delivery, usual terms of payment. Kansas City, Omaha, Council Bluffs and Minneapolis, ¼ cent added. Prices not guaranteed. Allowing for freight, New York prices would be ¼ cent lower than the above.

**Window Glass.**—Demand keeps up, whereas usually at this season trade is at the point of stagnation. The continuance of business has had the effect of steadying the market if reports are confirmed that prices were advanced 5 per cent. December 31 by the American Window Glass Company, and that its quotations are now 90 and 15 per cent. discount on the first three brackets, single, and 90 and 5 per cent. discount on larger single and all double strength, from manufacturers' list of January 1, 1901. It is also reported that a meeting of the committee of the Manufacturers' and Jobbers' Window Glass Company will be held this week, at which the minimum price will be advanced.

**Oils.**—*Linseed Oil.*—There is a feeling on the part of some of the trade that an advance in Linseed Oil is probable. The bulk of the new crop has been purchased and at the average cost of Seed crushers say they cannot afford to sell at ruling prices. Earlier in the season Linseed Cake advanced in price $6 or $7 per ton, owing to the export demand, which enabled crushers to sell their Oil at a comparatively low price. Since that time Linseed Cake has fallen back to about its former price, owing to lack of demand. Every change of a dollar per ton in the price of Cake is calculated as affecting the price of Oil ¾ cent per gallon. Seed cannot well be advanced without encouraging foreign importation, so that there is apparently no likelihood of a change in that direction. A few carloads of State and Western Oil were sold last week at 40 cents per gallon, for future delivery, but 41 cents is now the lowest price obtainable in any quantity. Paint and Oilcloth manufacturers, who are considered the largest consumers of Linseed Oil, are not in the market, owing to the lack of demand for their products. Trade is therefore confined for the most part to small lots. Change in the price of Oil may be deferred until spring demand commences, or later, or no advance may be made, but the desire of crushers to realize a profit on their Oil and their unwillingness to meet the views of buyers at the present time point to the probability of an advance. Quotations are as follows: City Raw, 43 to 44 cents, according to quantity; State and Western, 41 cents per gallon, for large or small quantities.

**Spirits Turpentine.**—From reports it appears that the effort to curtail the production of Turpentine has not been successful, and that the estimated output for the season will be approximately 10 per cent. above that of last season. Demand is light both here and at primary markets, though prices remain about the same as last week. Quotations in New York, according to quantity, are as follows: Oil barrels, 52½ to 53 cents; machine made barrels, 53 to 53½ cents per gallon.

## DEATH OF GEORGE L. BRIGHT.

GEORGE L. BRIGHT, of J. C. Bright & Co., died at his home in Pottsville, Pa., on the 1st inst., after an illness of six weeks. Mr. Bright was born in Pottsville in 1850. He received his preliminary education in Pottsville, and subsequently attended the Commercial Institute at Poughkeepsie, N. Y., where he underwent a special course in business training. Later he entered his father's Hardware store in Pottsville, of which he subsequently became manager, continuing as such until his death. Mr. Bright's enterprise, ability and integrity had much to do with the success of the business with which he was identified for so many years.

## THE ALASKA FREEZER COMPANY.

THE ALASKA FREEZER COMPANY, Winchendon, Mass., is offering for the present season the Alaska Freezer in nine sizes, from 1 to 15 quarts. A distinctive feature of this Freezer is the aërating spoon dasher with slotted spoon floats, including the regulation wood scraping bars. The dasher and freezing can revolve in opposite directions, and the angle of the slotted floats acting with the aërating spoons is said to impart to the mixture lightness and fine texture. The company also makes a fly wheel Freezer, 12 and 15 quarts. This is provided with a hinged gear frame, which permits the operator to remove the can or examine the contents without disturbing the fly wheel or crank or removing the gear frame. The North Star Freezer, single action, is offered to meet the demand for a good article at a lower price. The company also makes the Alaska Ice Chipper.

FRANK CLATWORTHY died at the Hotel Marie Antoinette, New York, Monday morning, January 2. Mr. Clatworthy will be recalled by the trade as the senior partner of the former firm of F. & W. Clatworthy, New York, who for over 20 years and until May, 1891, were the sole agents in the United States for Joseph Rodgers & Sons' Sheffield Cutlery. Mr. Clatworthy was born in England and was in his sixty-sixth year. He was a man of high character and pronounced ability. He is survived by his brother, William, who was the junior member of the firm.

LIVINGSTON NAIL COMPANY, 104 Reade street, New York, beginning January 1 will act as sole agent for the Essex Horse Nail Company, Essex, N. Y., in marketing its product of hot forged Horse Nails. All shipments will be invoiced and accounts collected from the Livingston Company's offices. The company will continue to handle the cold rolled product in Horse Nails, including the Anchor, Coleman and New Haven brands, as well as the Anvil, Western and Champion hot forged Nails.

J. STEVENS ARMS & TOOL COMPANY, Chicopee Falls, Mass., will have an exhibit of its Stevens-Duryea gasoline Automobiles, models L and R, the latter a new 20 horse-power four-cylinder touring car, at the fifth annual automobile show, to be held in Madison Square Garden, New York, January 14-21.

W. J. BARTON, formerly of the firm of Summers, Barton & Parrott, having sold his interest in that firm, has associated himself with Charles Nuchols, and they have incorporated under the name of the Barton-Nuchols Hardware Company, succeeding the firm of Lee & Nuchols Hardware Company. The capital stock will be $16,000, with $10,000 paid up. The company will occupy a three-story and basement building 30 x 165 feet, fronting on both Main and Market streets, also a warehouse 25 x 110 feet on Southern Railroad, and will carry, in addition to Heavy and Shelf Hardware, a complete line of Mill Supplies, Vehicles and Farming Implements, in which it expects to do both a wholesale and retail business.

THE WINCHESTER REPEATING ARMS COMPANY, New Haven, Conn., has been awarded a grand prize for its exhibit of the well-known Winchester rifles, shotguns and ammunition at the St. Louis Exposition.

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# TRADE WINNING METHODS.

*This department is for the description of approved methods of carrying on and extending business, and a cordial invitation is given to merchants to co-operate in the effort to make it suggestive and of practical use to the trade.*

## MERCHANT'S USE OF RURAL FREE DELIVERY.

*From a Retail Merchant in Pennsylvania:* Rural free delivery I find quite an advantage in many ways in getting immediate word to my customers as to the arrival of goods for which they are in a hurry. We have four routes, the carriers on which leave our town at 9 a.m. and are back at 4 p.m. Some other towns near us have routes, and the carriers do not leave until our morning mail reaches there, so we get pretty quick communication to them.

I know some people claim the rural service hurts trade in some towns, because the farmers do not go to their home town for their mail; consequently do not go there to trade, but buy from peddlers. This may be so in some cases, but so far as I am individually concerned I do not see as it hurts me.

The catalogue houses are the worse thing that merchants in the country towns have to contend with now, I think, but they would do just as much business if we had no rural free delivery. However, the only way to do, as I see it, is to keep your business well advertised before the public and meet prices when possible. Keep a good assortment and keep everlastingly hustling.

## INTRODUCING NEW GOODS.

Referring to their method of introducing new goods to the people in their territory Hardware merchants in an Ohio city write as follows:

About the most satisfactory manner we have of introducing new goods among our patrons is through mailing slips. We load our invoices with circulars of mailing size to as great an extent as the 2-cent postage rate will allow, and we believe considerable good is derived from this, judging from the number of inquiries we have for the new articles that we are trying to introduce in this way. Or course we advertise regularly in the newspapers.

## HOW TO MANAGE HELP TO SECURE BEST RESULTS.

BY OBSERVER.

*It is often best to give them absolute control of their various branches of the business so long as they show good results.*

How do you manage your helpers? Do you study and scheme and plan to settle the details of their work for them, or do you hold them responsible for results, and let them study out for themselves the details of the various moves?

There is this to remember, which has been taught by observation of great business enterprises: The man who does all the thinking for his establishment usually has a smaller business and dies younger, or becomes sooner incapacitated, than the man who leaves details to his subordinates. If the men at the heads of the various branches of your business are not capable of thinking it is time they were replaced by men who can think. It will be better for you personally and vastly better for the business itself.

### Ideas Show Young.

Even the youngest man in a business can give good ideas if he has had the right home training and a reasonable education. He should be encouraged to express them. They may be rough—undeveloped. A diamond is rough when it is taken from the earth, but the value is there. It takes a little cutting and polishing to bring it out; that's all.

Your office boy or junior clerk may see ways of improvement which will never occur to a man who has been longer associated with conditions as they exist.

### Their Worth Depends Upon You.

The value of these ideas depends largely upon you. The way you receive them and the manner in which you use them are both vital points. One man engenders fear in his subordinates. His helpers all sneak to cover, so to speak, the moment he puts foot in the store, and they don't draw an easy breath again until he goes out. Another works hard, treats his help kindly, but insists upon working out all the details. Both are upon the wrong track, and their business is bound to suffer. Both policies will take the originality out of assistants unless they are of the temperament to seek and find new positions. The result is identical so far as your business is concerned.

Suggestions should be welcome. You will get good, bad and indifferent ones, but your experience will point the discrimination between them. If a suggestion is impracticable, explain why. It doesn't take long, and the explanation will make the subordinate more willing to try again.

### Results Count.

If you know your business thoroughly you will know when work is done as it ought to be and when results are as good as they should be. If either is wrong, hold the man in charge responsible. If he can't remedy the faults, if he can't control his work, get some one who can. The right kind of men will become better men because of this confidence which you place in them and the responsibility which it necessarily brings.

### Employ the Time You Gain.

The time you gain in relieving yourself of detail work can be very profitably employed in looking after the larger moves which can be made to improve any business. Relieved of the worry of small details, your mind is clear to solve more important problems which are constantly arising. Many a good business has been injured, if not ruined, because thoughts were troubled with detail work when they should have been clear to deal with some greater proposition. This shifting of details means harder work for you. It doesn't mean leisure, by any means—not if your business is to gain by the change. It means an opportunity for more thinking—MORE CONCENTRATION. Concentration spells success.

### Don't Lose Sight of Details.

You'll still have to watch detail work—remember that. If you don't, you won't know whether it is going right or wrong. But so long as you're sure that it's right don't attempt to plan it out. Try this suggestion in YOUR business. You'll like the idea because it pays.

## GOING AFTER TRADE.

WE reproduce herewith the substance of several trade-soliciting letters which a Hardware merchant in a Vermont city sends out at different periods of the year. A letter somewhat similar in tenor to the following is sent to farmers twice a year:

*We invite your attention to the various lines of goods on which we are headquarters. Our stock of Hardware, Tools, Cutlery, Sporting Goods, Roofings, Paints, &c., is one of the most complete in the State. As our purchases are direct from manufacturers at lowest prices we are in a position to save you money, and we respectfully ask you to call or write for prices, and give us a trial.*

*In Poultry Netting, Farm and Garden Tools, Lawn Mowers, Ice Cream Freezers and Food Choppers we have just what you want at prices that will interest you.*

*We also carry a large stock of Farm Fencing, Barbed and Plain Fence Wire and Fence Staples, and on these can name you low prices.*

The letter below is sent to those whom the firm knows are getting ready to build:

*We understand that you are about to do some building and take this opportunity of calling your attention to some of the goods on which we are headquarters.*

*Beginning with Nails, Corner Bead and Paper, we can fix you up right through with Sash Weights, Cord and Pulleys, and all kinds of trimmings, and for outside and inside finish call your attention to ——— Paints and ——— Varnishes, for which we are headquarters and carry a large stock. These, with a large and well assorted stock of ——— House Trimmings, ——— Butts and ——— Hangers, enable us to fill all orders promptly and give our customers the most representative goods on the market.*

*We shall be pleased to have a call from you and to quote prices.*

A letter like the one below, with Mill Supplies as its principal theme, is sent through the mails three times a year:

*We shall be pleased to have your order for anything in the line of Mill Supplies. We make a specialty of these goods and are in a position to give you lowest prices and quickest shipments.*

*To-day we quote:*

*Jewell's Short Lap Leather Belting, 60 and 10 %.*

*Good Grade Rubber Belting, 60 %.*

*Black Diamond Files, 70 %.*

*Eagle Files, 70 and 10 %.*

*Raw Hide Cut Lacing, 50 %.*

*Jones Belt Hooks, 70 %*

*Frictionless Babbitt Metal, 22 cents per pound.*

*We can also quote you lowest prices on Packings, Cotton Waste, Belt Dressings and Cements, Screws and Cement Coated Nails, all of which we carry in stock and can ship promptly.*

With each of the letters is inclosed advertising circulars, booklets, &c., featuring certain goods, which the firm obtains from manufacturers for the asking.

## CHICAGO HARDWARE MARKET IN 1904.

IN spite of an unusual number of unfavorable natural conditions, mainly those of weather, the books of the Hardware trade for 1904 will show a volume of business and an average of profit that very favorably compare with previous years. The coldest winter on record lingered in the lap of spring a length of time that was almost disheartening, and as soon as warm weather did develop it was accompanied by a general depression due to a variety of causes, chief of which was perhaps the fact that this was Presidential year, and to cap the climax delightful autumn weather continued long after snow and frost were expected and hoped for by dealers who had loaded up with winter goods. The only thing that saved the Hardware trade of the country, and it did it nobly, was the wealth and confidence and enterprise of the great agricultural population of this country. For a long period of years crops have been bounteous and in the main prices have been highly remunerative, and when it became evident early in the summer that the hay crop was exceptionally large, that the corn crop bid fair to be a record breaker, that oats and rye and lesser grains were in proportion to corn in their yields, and that wheat, though a small crop, would command an unusually high price, farmers began to invest their savings in necessities and luxuries for the farm and fireside. No better method of illustrating the trend of affairs from month to month suggests itself than to follow this general description with items picked from succeeding issues of *The Iron Age* in diary form:

January 14.—Record breaking cold weather. Wire and Nails advanced $1; Cut Nails reduced $4; both moves stimulated buying. January 28.—Edged Tools advance. March 1.—Business improving as a result of stimulus received at Hardware conventions. Buying active. Prices strong. March 10.—Nails and Wire advance another dollar. March 31.—Disastrous floods in the West. Chicago business demoralized but prices strong. Cut Nails advance. April 7.—Activity in Builders' Hardware, particularly in and about Chicago; warranty withdrawn on Axes and Hatchets by makers acting in unison. April 14.—Chain higher. Floods still interfere with business. April 28.—Dealers well stocked. Business quiet, due to continued wet weather. May 26.—No sign of summer yet. Refrigerator trade almost at a standstill. June 2.—Few warm days do wonders for the trade. Hardware dealers everywhere interested in results of the Atlantic City conventions, especially their discussion of the catalogue house evil. June 16.—Patents expire on Coated Nails and prices are cut $4 to $5 a ton. June 23.—Wire Nails and Wire and Cut Nails reduced in price. Business dragging. June 30.—Recent advances noted in Wrenches, Hammers, Double Pointed Tacks, Tapes, &c. Important catalogue house conference by national committees at St. Louis. July 7.—A few weeks of hot weather have developed large demand for Lawn Mowers, Refrigerators, Ice Cream Freezers, &c., but for most dealers this comes too late. August 18.—Large reduction in the price of Smooth Wire, Barb Wire and Wire Nails. September 1.—The weather bureau says August has been the coldest August in the 33 years' history of the Chicago weather bureau. Many large buildings close contracts for Builders' Hardware. September 15.—Fall trade delayed by hot September, which, however, is a godsend to corn. Corn Tools of all kinds in demand. Handle makers have made up new list. October 6.—General business excellent. Wire active. Heavy buying. Prices well sustained except in territory tributary to the Colorado Fuel & Iron Company and the Alabama Steel & Wire Company, where merry wars are in progress. Cut in price of Hatchets, with notice that advance will be made November 15. Chisels, Picks, Mattocks, Wedges, Crow Bars, Barn Door Hangers and fixtures all lower as a result of disagreement between makers. October 13.—Galvanized Sheets stronger. Axes 25 cents higher. Chicago building permits break all records. October 20.—Bolts and Nuts advanced 5 to 10 per cent. October 27.—Door Hanger Association goes to pieces. Small snowfall deluges retailers, jobbers and makers with orders for Snow Shovels. November 10.—Bolts advanced still further. November 17.—Hatchets and small Axes advanced as scheduled. November 24.—Wire, Wire Nails and Cut Nails up $2 a ton. Hardware conventions at Atlantic City discuss catalogue houses and special brands. December 15.—Nails and Wire again advanced $1.

The above, together with the accompanying chart of the movement of Wire products and Cut Nails, will tell the story of the year more graphically than might be done in a detailed review:

### Chicago Wire Nail Prices.

The course of prices of carload lots at Chicago during 1904 and for several years preceding is shown in the following table, the monthly prices being averaged from weekly quotations in our market reports:

| Months. | 1904. | 1903. | 1902. | 1901. | 1900. | 1899. | 1898. | 1897. |
|---|---|---|---|---|---|---|---|---|
| January | $2.04 | $2.08 | $2.16 | $2.35 | $3.53 | $1.59 | $1.55 | $1.50 |
| February | 2.05 | 2.12½ | 2.20 | 2.45 | 3.53 | 1.73 | 1.57 | 1.45 |
| March | 2.09 | 2.20 | 2.20 | 2.45 | 3.53 | 2.09 | 1.55 | 1.50 |
| April | 2.10 | 2.15 | 2.20 | 2.45 | 3.28 | 2.25 | 1.47 | 1.45 |
| May | 2.10 | 2.15 | 2.20 | 2.45 | 2.53 | 2.35 | 1.45 | 1.42½ |
| June | 2.07 | 2.15 | 2.20 | 2.45 | 2.48 | 2.60 | 1.43 | 1.42½ |
| July | 2.05 | 2.15 | 2.20 | 2.45 | 2.43 | 2.70 | 1.36 | 1.35 |
| August | 1.90 | 2.15 | 2.20 | 2.45 | 2.43 | 2.80 | 1.36 | 1.37½ |
| September | 1.75 | 2.15 | 2.15 | 2.45 | 2.35 | 3.10 | 1.45 | 1.50 |
| October | 1.75 | 2.15 | 2.05 | 2.42½ | 2.35 | 3.20 | 1.47½ | 1.52½ |
| November | 1.77 | 2.15 | 2.00 | 2.35 | 2.35 | 3.28 | 1.40 | 1.50 |
| December | 1.88 | 2.00 | 2.00 | 2.25 | 2.35 | 3.53 | 1.37½ | 1.50 |
| Average for year | $1.97 | $2.13 | $2.14½ | $2.41 | $2.76 | $2.60 | $1.45 | $1.46 |

### Chicago Cut Nail Prices, 1904.

The following are the Chicago prices for Cut Nails in car lots during the year:

| | | | |
|---|---|---|---|
| January | $1.91½ | July | $1.80¼ |
| February | 1.86½ | August | 1.78¾ |
| March | 1.87½ | September | 1.75 |
| April | 1.91½ | October | 1.75 |
| May | 1.91½ | November | 1.77½ |
| June | 1.87½ | December | 1.88 |

Average for 1904, $1.84¼; 1903, $2.33; 1902, $2.25; 1901, $2.34; 1900, $2.48.

### Chicago Barb Wire Prices.

The course of prices of Galvanized Barb Wire in carload lots, Chicago delivery or equal, has been as follows in 1904 and several years preceding, our weekly quotations being averaged:

| Months. | 1904. | 1903. | 1902. | 1901. | 1900. | 1899. | 1898. | 1897. |
|---|---|---|---|---|---|---|---|---|
| January | $2.64 | $2.68 | $3.01 | $2.95 | $4.13 | $2.05 | $1.90 | $1.90 |
| February | 2.65 | 2.75 | 3.10 | 3.05 | 4.13 | 2.25 | 1.90 | 1.85 |
| March | 2.69 | 2.80 | 3.10 | 3.05 | 4.13 | 2.62¼ | 1.90 | 1.90 |
| April | 2.70 | 2.77 | 3.10 | 3.05 | 3.88 | 2.80 | 1.87½ | 1.80 |
| May | 2.70 | 2.75 | 3.10 | 3.05 | 3.13 | 2.95 | 1.80 | 1.80 |
| June | 2.68 | 2.75 | 3.10 | 3.05 | 3.13 | 3.20 | 1.80 | 1.75 |
| July | 2.65 | 2.75 | 3.06 | 3.05 | 3.10 | 3.30 | 1.80 | 1.75 |
| August | 2.42½ | 2.75 | 3.00 | 3.05 | 3.10 | 3.40 | 1.80 | 1.65 |
| September | 2.20 | 2.75 | 3.00 | 3.05 | 3.00 | 3.67½ | 1.80 | 1.80 |
| October | 2.20 | 2.75 | 2.68 | 3.05 | 3.00 | 3.77½ | 1.82½ | 1.80 |
| November | 2.22½ | 2.75 | 2.60 | 3.05 | 3.00 | 3.88 | 1.82½ | 1.80 |
| December | 2.33 | 2.60 | 2.60 | 3.00 | 3.00 | 4.13 | 1.82½ | 1.80 |
| Average for year | $2.51 | $2.74 | $2.93 | $3.04 | $3.39 | $3.17 | $1.85 | $1.80 |

# Views of Manufacturers in Regard to Business in 1905.

WE have recently been in correspondence with a number of the leading manufacturers in the Hardware and related lines with a view to ascertaining their judgment of the situation, and especially as to the character of business for which manufacturers and the trade generally should make preparation. The general tenor of the advices thus received is given in the following columns. Without attempting to anticipate the more detailed reference to the opinions thus summarized, it may be premised that they are on the whole exceedingly gratifying, and if confident expectations from this most representative department of the trade count for anything there is abundant reason for entering on the new year in a hopeful spirit and with corresponding enterprise. While there is, of course, always uncertainty as to the future of trade inasmuch as influences entirely unforeseen may arise to change the situation materially, there is no doubt that the judgment of manufacturers in such matters is entitled to be regarded with peculiar confidence. It is certainly especially important for them, so far as their own interests are concerned, that their forecasts of the course of things should not be greatly in error. This consideration relates particularly to the contracting for raw material and the quantity of goods made by them in anticipation of the demands of the trade. Manufacturers, too, have especial opportunities for forming a correct judgment from their contact with the market, as many of them, by their relations with the trade, have to do with conditions in practically all parts of the country. They are thus given the breadth of view which is essential in forming a judgment as to the business outlook. Their relation with the market has also to do with the two great factors in determining the course of things. On the one side they are in contact with the conditions which prevail in the market for the raw material which enters into their goods, and on the other with the distributors, wholesale or retail, or both, through whom their products reach the consuming classes. Adding force to these considerations, which give weight to the views of Hardware manufacturers in regard to business prospects, is the high position occupied by them and the recognized ability of many of them as business men.

## THE COUNTRY'S PROSPERITY.

Advices from manufacturers who have given the matter careful study instead of being content merely in a general way to accept the prosperity of the country in accordance with the prevalent impressions, emphasize the fact that throughout the length and breadth of the land, with only rare exceptions, the people are enjoying remarkably prosperous conditions. The elements of this well being are the abundant crops commanding excellent if not in all cases high prices, labor well employed, manufacturers as a rule having done and looking forward to doing a large business; a spirit of enterprise much more pronounced than a short time ago; financial situation without cause for disquietude, and, in short, the whole productive and commercial machinery of the country in active operation. The important part in promoting the general prosperity which is played by the crops and the exceptional bulk and value of those harvested the past season is alluded to by many of our correspondents, as illustrated in the following letters, which are in their general drift and spirit similar to many others:

### Business Never Looked Brighter.

*From a Manufacturer in New York State:* Our business never looked better than at the present time. In fact, from all we can learn, and judging also from the orders we have already received for shipment in the spring, business will be the largest we have ever had. This may not be true in building Hardware, but goods that are used by farmers must certainly have a larger demand than ever before, for at the present time the farmers are prosperous in all parts of the United States, and our men all report the prospects for spring very bright.

### Purchasing Power of Farmers.

*From Manufacturers in Illinois:* According to the Government reports the valuation of wheat, corn, cotton, barley and oats exceeds the value of these crops of one year ago by nearly $2,000,000,000. This increases the purchasing power of the farmers greatly, and whenever the farmer is prosperous we figure that all other branches are prosperous. The lumber business at the present time is in a very prosperous condition. Steel and iron business, which comes first, is also in a prosperous condition, and we look for an especially large business during 1905.

### 1905 To Be Better Than 1904.

*From Manufacturers in Pennsylvania:* We are and have been very busy; have all the orders we can possibly attend to, and indications point to a steady demand for our goods, not only for the home market but for South America and Europe. We believe the coming year will be a great improvement over the past year. Crops have been good and in some lines extraordinary. Prices are good, which will enable the farmer to buy the necessary goods and Tools. Taking this view of the matter, the indications are very strongly in favor of prosperity for the home market, which after all is the best market.

### Outlook Unusually Bright.

*From Manufacturers in Missouri:* We feel that the outlook for the coming year is an unusually bright one, and shall be very much disappointed if 1905 does not bring to this country very much improved business conditions. Legislation at Washington may to some extent retard things, but we do not feel that it will. While radical action may be taken in some cases at the same time the country is so large, the crops have been so great, the banks so full of money and the private investor willing to take up anything which offers reasonable return, that we cannot look at it in any other light but that of a fine business year. Our business during 1904 was good, and as far as we can see at present very satisfactory.

### Prospects Flattering.

*From Manufacturers in Pennsylvania:* The prospects for next year's business to us look very flattering. The country is in excellent condition. In the West they are realizing good prices for wheat and corn. In the South an extraordinary crop of cotton, which, notwithstanding the comparatively low prices ruling, yields the planter a handsome profit—this we judge by what we hear from prominent Southern merchants. Our opinion is that we will have all the business that we can do.

### Market Looks Well.

*From a New York Manufacturer:* The market looks well to us on account of the steadily increased consumption, raw materials have advanced, and we predict that they will remain firm and in all probability advance further. The prospects for business in 1905 are very bright; the people are prosperous now and with an almost

$3,000,000,000 crop recently harvested, continued prosperity would seem to be vouchsafed unto us.

### Not So Confident.

*From Manufacturers in Connecticut:* We are not so cock sure about the business of next year as some other people are. We are in shape to take care of it if it comes, and we hope it will come, but it seems to us that that which will make the difference between boom times and such times as we have been having in 1904 is the capacity of the average citizen to buy something more than rent, fuel, food and clothes. It seems to us that the cost of living has increased much more in the last few years than the wages of workingmen. There are a good many more people in 1904 than there were in 1900 all of whose wages goes for the necessities of life. That is why business has not been so good. Something which will remedy that situation will make business better. Until this remedy comes there will not be any great improvement in business in our opinion.

## THE DEMAND FOR GOODS.

That the confidence in the future business of the country is not limited to manufacturers, but is shared also by merchants is indicated by the character of the purchasing of the trade during the past month or two. In sympathy with the strength of the market and the gradually improving outlook for business during the closing months of 1904, merchants, especially the wholesale merchants who are apt to look farther ahead and to act more promptly in accordance with the developments of the market have been placing orders with much more liberality than has recently been their practice. As a consequence of this confidence in the market, which is of course more or less dependent on the conviction that the volume of business will be large, merchants have been placing their orders earlier and for larger quantities than for some time. Reflecting the general condition in this regard we make the following selections from letters of representative manufacturers:

### Placing Orders Very Liberally.

*From Manufacturers in Illinois:* We are confident that the market in our class of goods will be firm for some time to come. Raw material is not only firm but advancing. The up to date merchant, especially the forehanded merchant, is placing his orders very early. In doing this we believe he is acting very wisely. There will be a shortage of goods before July 1. This will strengthen prices and probably raise a good many. We believe if the manufacturers of this country would show their order books it would be found that they have more business booked at this date than is usual by a large percentage. We see no season why 1905 should not be a great year for business. We are preparing for a larger business and a rapid growth in the next three or four years and shall be disappointed if we do not have it.

### Liberal Buying.

*From Manufacturers in Ohio:* We consider the prospects very good for the coming year. Dealers are placing orders for spring shipments much more freely than they did one year ago. In fact there is quite a marked difference. We are expecting a very large business during 1905.

### Orders for 1905.

*From Manufacturers in Connecticut:* We believe the outlook for trade in our various lines of manufacture is better for the coming year than it has been for several years, although in one of our lines large buyers have placed orders extending practically through the season of 1905, and in some instances at prices below what the goods could be made for. Such a condition we feel is injurious to orders in the near future. We notice a disposition on the part of large buyers to now place orders covering as nearly as possible their wants for 1905. This we are discouraging as much as possible.

### Overwhelmed With Orders.

*From Manufacturers in Ohio:* Prospects for business in 1905 are very bright. We have been overwhelmed with orders during the past three or four months and there is every prospect of this condition continuing during the coming year, and we are making preparations in our manufacturing department to handle it.

### Early Buying.

*From Manufacturers in Illinois:* The prospect for business in our line for 1905 is very good, and the indications are that buying will commence unusually early; in fact, a number of merchants are already placing orders for 1905 delivery so as to insure prompt delivery and to guard against possible advances in price. The labor conditions have improved considerably in the West, and I hardly think any serious trouble from the unions will occur.

### Stocks Below Normal.

*From Manufacturers in Pennsylvania:* We really feel assured that "chronic croakers" should be more than satisfied with the present as well as prospect for next year, as conditions in every way, to our minds, are most healthy and most favorable that could be wished for. True, we are all working on a low plane as to margins and think it might be well said that the water has been well absorbed in all cases. The stocks over the entire country have certainly been reduced far below normal conditions, and taking the demand for the present month as a forerunner of what surely must follow, we feel assured that the time will speedily come when buyers over the country will not be able to secure their requirements for their pressing wants. The absolute scarcity that now seems assured will certainly bring about healthy prices, and on the whole we feel that all should feel assured that better times are beyond a doubt overtaking and controlling the trade in general.

### A Large Volume of Business.

*From Manufacturers in Ohio:* Our business in volume is much larger during the past three months, and has increased in volume by at least 50 per cent. That is to say, we shall do this month at least 50 per cent. more than we did in the month of September, with prospects of further increase in January. From all we can learn the outlook for a large demand is good for the next six months, but the important question of profit is not so certain, as business in our line this fall has been taken on a very low price basis and unfortunately for delivery to a considerable extent in the future.

### Behind Their Orders.

*From Manufacturers in Illinois:* The prospect for business for 1905 is excellent. During the past three or four months it has been very brisk, and we are at present considerably behind our orders and are confidently looking for this condition to continue for some time to come. From all parts of the country, with the exception of the Dakotas and Northern Iowa, we have good reports Everything indicates a brisk demand, however, from al other sections, and we have every reason to feel that our business for the year 1905 will largely exceed in volume that of the present year.

### Renewed Business Activity.

*From Manufacturers in Indiana:* There is every indication of renewed business activity for the coming year. While business is poor just now and our December sales will be light, yet we are receiving an unprecedented number of orders for January 2 shipment and after. We have already booked perhaps half the business we ordinarily do in January. The best feature, however, is the fact that nearly everybody expects good business, and this alone has a tendency to bring it. We are all more or

less like a drove of sheep going wherever the bell-wether leads, oftentime without rhyme or reason. The pendulum is swinging in the right direction, we think.

### Contracting Ahead.

*From Manufacturers in Ohio:* All indications point toward an unusual demand this spring for goods in our line. We find dealers, in specifying for spring shipments, are giving their orders in larger quantities than previous years, and are endeavoring to contract ahead as far as possible. We understand some manufacturers who have been low priced have made some advances in their prices recently, and with Steel and other materials stiffening in price, indications are that better prices should prevail when the active consumptive demand starts in. From all the information we have throughout our territory and that traveled by our men, retailers and jobbers are of the same opinion—that unless some unforeseen accident occurs the volume of business will far exceed anything during the past one or two years. Collections are good with us and we are running our factory to its capacity to take care of orders that we have on our books.

### More Placing of Orders Than Ever Before.

*From Manufacturers in Pennsylvania:* We have never seen a time when prospects at this season of the year appeared so bright as at present. Nineteen hundred and four has been our largest year in amount of business done, and we will start into 1905 with more specified orders on our books than at any time before. The tendency on part of buyers is to place more orders and for later shipment than we care to accept under present conditions in the steel market. It appears as if our business next year will be larger than during 1904, and we expect to increase still further our manufacturing facilities to be able to take care of it.

### 1905 To Be a Record Breaker.

*From Manufacturers in Connecticut:* The year now drawing to a close has been a most satisfactory one and every indication is that 1905 will be a record breaker. Our traveling men report buyers in all sections of the country looking forward to an unusually large business during the year, and are backing their convictions by placing good orders for spring delivery. We have at the present time more orders on our books for future delivery than we have had at the corresponding time in three years past. It would seem to us that it will be necessary for buyers to anticipate their wants to a considerable extent in most lines to secure prompt delivery when the goods are needed.

## THE RAW MATERIAL MARKET.

The strength of the market for Iron and most of the metals which enter into Hardware articles is frequently referred to by our correspondents. This is obviously a matter to which manufacturers must give most careful attention on account of the necessity which rests upon them to purchase their material at the proper time and in proper quantities, in view of the condition and the future course of the market. Very frequently manufacturers have made the mistake of contracting to supply goods without covering themselves on the raw material, which, having advanced in price, left them the unpleasant responsibility of executing orders without profit and sometimes at an actual loss, while their wiser competitors were enjoying an exceptionally profitable trade. In the present state of the market manufacturers are very generally, especially when the raw material is an important part of the cost of the goods, refusing to book orders for delivery except in the near future, and are meanwhile endeavoring to purchase their supplies in sufficient quantities to cover their requirements far into the year. While the strength of the Iron market is a notable feature of the situation and unquestionably has done much to stimulate the large buying on the part of the trade, some of our correspondents express the apprehension that these prices have been advanced too rapidly, and a failure to maintain them and a reaction toward a lower level is referred to by several as the principal element of uncertainty at the present time. Notwithstanding this caution it will be observed that even those who take this conservative view are at the same time anticipating a large volume of business and generally prosperous conditions. This feature of the situation, this possible menace to the market, is deserving consideration and what is said in regard to it in the following letters will be of interest:

### Buying Material Liberally.

*From Manufacturers in Ohio:* About four months ago we were so confident that there would be a return of prosperity in 1905 that we not alone covered our requirements for the first half of next year but also increased these 50 per cent. above our 1904 requirements and are now satisfied this was only too conservative. We have already booked orders for unusual quantities of our goods for delivery in 1905. A year ago it was a difficult matter to get the trade to anticipate their wants, whereas all the largest firms are now doing so. This of itself is a very good indication.

### The Demand for Material.

*From Manufacturers in Pennsylvania:* While prices on some of our goods are unusually low and trade has been very dull most of the season, we feel that the outlook for the coming year is unusually attractive. December is usually our dullest month during the fall season, while this year it will prove decidedly the largest. This shows that we are already feeling the effects for the coming season. We also hear from the mills who are supplying us with material that they have practically sold their production for the first six months; in fact one or two of them, who are old friends of ours, and have been selling us Steel for over 20 years, asked as a favor to cut down our wants to the lowest minimum, as they are not booking any new business and they are only favoring their oldest friends in taking contracts at the present time. The crops from all parts of the country are not only unusually good, but the prices as well. We therefore feel very optimistic in regard to the future.

### The Advances in Iron.

*From Manufacturers in Ohio:* We are of the opinion that the recent radical advances in material are rather unwarranted, and while at the present time it has stimulated buying very materially, we think that after present orders are completed a decline is probable. The prospects for business for 1905 seem to us to be very favorable for a large volume of business.

### Will There Be a Reaction?

*From Manufacturers in Ohio:* Prospects with us for the coming season could not be better. We have business booked for the first four months of the year at much better prices than prevailed a year ago, and the orders received daily indicate to us that next year is going to be a very busy year. We are not entirely satisfied with conditions in the Iron market, however, as we feel that the furnaces have put the price up too rapidly and there is liable to be a reaction later on. The writer has recently attended a number of meetings of manufacturers in our line, and the feeling prevails that next year is going to be a very big year, especially on account of the dry weather of the past few months.

### Prices a Little Too High.

*From Manufacturers in Ohio:* The general outlook from our point of view is eminently satisfactory. We do not anticipate anything more than a good stiff demand for finished products in our line for 1905, and we are making our plans to meet a condition of this kind. We

are inclined to be of the opinion, however, that the prices of some raw materials and finished commodities are a little too high to last through the entire year of 1905. This, however, does not apply to any lines except those carrying what might be termed to-day extremely high prices.

## OUTLOOK FOR BUSINESS IN 1905.

Partly as a result of the country's prosperity and partly as a reaction or rather a recovery from the somewhat depressed conditions which prevailed six or eight months ago, there is evidently a quickening of the pulses of trade and an altogether more confident and aggressive tone in commercial and financial life. That to this most healthful and invigorating condition the extent and monetary value of the crops gathered has largely contributed is beyond question, but at the same time there are doubtless many influences which unite in producing the confident and sanguine expectations which are very generally entertained. In one of the letters given below it will be observed that our correspondents refer to the fact that their company has not had reports of unfavorable market conditions from a single Hardware jobber in the entire country or from its traveling representatives, a statement which is especially significant as coming from one of the largest manufacturing concerns, which has relations with practically every important house in the United States. But our readers can judge more intelligently of the views of the manufacturers from the following extracts from their letters, which were written not with any thought of publication but simply as giving a brief and frank expression of opinion in the presence of existing conditions.

### A Dazzling Prospect.

*From Manufacturers in Massachusetts:* Our forecast for 1905 appears so brilliant that it dazzles us. We believe that unless something unforeseen happens the next year will be the biggest in the Tool trade that ever been known in this country. Even now, in the month of December, our sales are exceeding our production and this does not include orders which we have on hand for future delivery and which are greater in volume and number than ever before. We believe the stocks in the hands of the merchants are very low and while it has never been customary for dealers to speculate in our line they are in the habit in ordinary years of ordering what they actually require. In the event of their doing this in the year just ahead of us, it must of necessity be a very large one.

### Few Disturbing Factors.

*From Manufacturers in Rhode Island:* All present indications seem to point to a good volume of business during the coming year, and in our own case we are hoping to turn out a larger tonnage than in 1904, which has realized very satisfactory results. There has rarely been a time when the disturbing factors in the problem were so few and of so little weight, thus giving rise to a feeling that good business, good prices, and good times are a foregone conclusion for the year to come. We trust that nothing will occur to prevent the realization of these most promising omens, and that when the business records of 1905 are complete it will prove to be the banner year in the business history of our country in every way.

### Very Promising Outlook.

*From Manufacturers in Ohio:* From our representatives and otherwise we are in touch with the market conditions of the country generally, and are gratified to say that trade prospects look very promising. We believe that the year 1905 will be better than any previous three years—larger volume and more profit. The only thing the writer sees to fear is the danger of the metal men setting up their prices so high that they must react, and so high as to check the consumption. We have not had unfavorable market condition reports from a single Hardware jobber, or from any of our representatives on the Pacific Coast, in the south or in the north.

### The Best Year.

*From Manufacturers in Pennsylvania:* The prospects for the coming year are bright with us and while we do not look for an exceptional boom we think it will be by a slight margin the best year in the history of the Iron and Steel industries. We think the stock market and manipulations in general will have less influence and the policy of labor will have more influence on conditions than in the past, and we think the labor unions will be less of a factor for harm than during the past three years. In our own lines business is not yet up to normal and will not be for several months, but a slow improvement is more desirable than a sudden demand which would be surely followed by a sharp and demoralizing reaction. There are many reasons why we should have a prosperous year and the few reasons why we should not are all more or less of an accidental nature.

### Prospect Never Brighter.

*From Manufacturers in Connecticut:* The market for our products from our standpoint looks very bright for the coming year. Market conditions indicate that present prices will be firmly held and maintained, and without anticipating any speculative demand believe there never was a brighter prospect ahead for Hardware manufacturers than at the present time.

### A Record Breaker—1905.

*From Manufacturers in Connecticut:* From our standpoint prospects were never brighter at this season of the year than they are for 1905. It looks to us like a record breaker, and we feel very positive that our anticipations will be realized unless some unforeseen calamity is in store for us.

### Good Prices and Large Demand.

*From Manufacturers in Alabama:* Judging from present appearances, which means taking into consideration the crop reports of various sections of the country as a basis and adding to this the fact that improvements and extensions in various lines have been held up for the past year or two, also on account of the recent election, all point to a large consumption of material, which means a prosperous year ahead of us. We are not looking for prices to be at the highest, but do expect an advance over the present prices, and feel certain that the demand for iron and steel will be very much larger than for the past two years. At present our own company is far behind with orders, yet we are not soliciting, as the voluntary orders are more than sufficient to keep us booked far ahead, in fact we are refusing to accept orders even from our best customers for shipment later than February 1.

### Marked Prosperity.

*From Manufacturers in New Jersey:* We have rarely approached a new year with such a distinct feeling of confidence. We can see no reason to doubt the prevalent idea that a year of marked prosperity is before us. All the indications that we can see are favorable, and some of our friends in the Middle West are beginning to be anxious about deliveries, assuring us that they expect their demands will be phenomenal.

### Demand from Consumers.

*From Manufacturers in Pennsylvania:* We feel quite confident the year of 1905 will bring most excellent business conditions. We hope these conditions will endure at least as long as the year lasts and firmly believe they will. Our confidence is not limited to words, but we have enlarged our facilities with a hopeful expectation and do not now think we will be disappointed. There is one noticeable feature at present quite evident—that is, the active demand for goods seems to spring from the consum-

ers. We are led to this belief through the number and the character of sort up orders in seasonable lines. If our diagnosis in this respect be true, we think it must follow that business is in a very healthy condition and has excellent prospects.

### Three Good Years.

*From Manufacturers in New York:* Business at the present time as well as the prospect for the year 1905 is indeed very good. We believe that the effect of the cry of the Presidential year wolf is past, and from the way that orders have been placed for the last 60 days we are looking forward to a bigger year for 1905 than we have ever had before. We think there are at least three good years in sight.

### Confident Outlook.

*From Manufacturers in Ohio:* If we might judge from our own experience the conditions are fine and our business is good in all branches, and we are looking for the largest business we have ever had during the year 1905. Our goods eventually land with the farmers, and of course in almost all parts of the country they have all been prosperous, and we, in common with the other people who are selling goods that the farmer uses, are expecting to get our share of his prosperity. The advance orders seem to warrant us in this expectation.

### A Good Demand the Coming Year.

*From Manufacturers in Massachusetts:* The past year has been a record breaker with our firm, and, although with increased facilities, we have been unable to accumulate stock. This is the dull season, and we are now making a few more goods than we are shipping. We are having a fair run on small orders, and are running full capacity in confident expectation of a good demand the coming year.

### Gains and Losses.

*From Manufacturers in New York:* Business in our line will be about the same as it has been for a year or two past, making some slight gains in some sections and possibly a slight loss in others. On the whole fully as good, with the prospects of a trifle increase if anything.

### Country in Sound Condition.

*From Manufacturers in Ohio:* Business with us for the latter part of 1904 has been very good and we have had more business than we could take care of. Our sales for the year have run 20 per cent. ahead of any previous year of our existence. We think that the country is in a very sound condition. The farmers have been blessed with good crops and good prices are ruling. Labor is very well employed. Our export trade is growing. Covering the entire United States and Canada with our travelers direct and having recently come into contact with leading Hardware jobbers and manufacturers, and in looking over our very bulky unfilled order files, we have no hesitancy in saying that we look for a very fine year for 1905.

## PACKARD HARDWARE COMPANY'S CATALOGUE.

PACKARD HARDWARE COMPANY, Greenville, Pa., has just issued an illustrated catalogue, No. 3, containing 677 pages, devoted to a general line of Shelf Hardware, Metals, Chains, Wagon Wood Work, Feed Cutters, Wheelbarrows, Tackle Blocks, Rope, Pumps, Harness, Straps, Saddlers' Hardware, Brushes, Oils, Paints and Varnishes, Tinware, Hollowware, Scales, Gas, Water and Steam Fittings; Sewer Pipe, &c. A view of the company's establishment is shown on the first page, followed by an alphabetically arranged index of 12 pages. The catalogue is well bound in cloth, printed on a good quality of paper, fully illustrated, with list prices conveniently arranged and suitable in all particulars for use by the company's appreciative and growing trade.

## TRADE ITEMS.

UNDER date of the 31st ult., Clinton E. Hobbs announces that he has severed his connection with Dodge, Haley & Co., Boston, with whom he has been identified for the past 22 years. Mr. Hobbs also announces that beginning January 2 he will be associated with the A. M. Wood Company, 51 and 53 Beverly street.

THE YALE & TOWNE MFG. COMPANY, 9-11 Murray street, New York, and Stamford, Conn., announces the following recent changes in its executive staff, viz.: Schuyler Merritt has resigned the position of secretary, retaining that of vice-president. J. H. Towne has resigned the position of general manager and has been elected secretary. Kirk Brown, formerly president of the American Dunlop Tire Company, has been appointed general manager. A. R. Erskine has been elected treasurer, vice E. W. Riker, resigned.

THE CALDWELL MFG. COMPANY, Rochester, N. Y., has engaged the services of John G. O'Brien, who will in the future represent the company on the road as successor to the late Mr. Boucher. Mr. O'Brien has been associated with the Pullman Mfg. Company, also of Rochester, for many years, and is thoroughly familiar with this line and with the Hardware trade.

THE LIVINGSTON NAIL COMPANY, 104 Reade street, New York, will issue a new catalogue on January 15. This catalogue will be materially larger and more comprehensive than any which the company has heretofore sent out, and will contain a full line of Horse Nails and Shoes, Heller's Files and Rasps, Hay-Budden Anvils, Blacksmiths' Aprons, Toe Calks and other Horseshoers' Supplies. The trade are requested to write for a copy of the catalogue.

PUTNAM NAIL COMPANY, 50 Congress street, Boston, calls the attention of the trade to the fact that it is making only one grade of Horseshoe Nail, the New Putnam, the merit of which it emphasizes, together with the point that the company's machines make no seconds or inferior Nails. The company remarks that the difference in price between high grade Nails and the cheapest on the market amounts to but 1½ cents per horse. The condition of its business is indicated in the fact that the capacity of its plant is taxed to the utmost to fill orders, and that new machinery is being added from time to time.

THE EUREKA COMPANY, Rock Falls, Ill., gave a business "At Home" to a large number of its customers last week. The guests spent two days in Sterling and Rock Falls, during which time they inspected the plant of the company and became acquainted with the members of the firm. They were given a banquet and theater party on two successive evenings.

## ANDREW B. HENDRYX COMPANY.

THE ANDREW B. HENDRYX COMPANY, New Haven, Conn., has just issued a beautifully bound and attractively printed catalogue of nearly 400 pages. It illustrates Bird and Animal Cages, Cage Specialties, Bronze, Brass and Iron Chain, Wire Picture Cord, Fishing Reels, Baits, mist color Silkworm Gut Leaders, Treble Hooks, &c.

FREDERICK B. MALLORY died at his home in Los Angeles, Cal., Saturday morning, December 24 last. Mr. Mallory succeeded his father, Burton Mallory, as part owner and manager of the Mallory-Wheeler Company, once a leading concern in the manufacture of Door Locks, Pad Locks and builders' Hardware. It is a curious fact that the father died on the same date, December 24, in 1878, Frederick B. Mallory succeeding his father in business at that time.

THE sales agents reporting to the Baltimore branch of the National Enameling & Stamping Company held a banquet on the 30th ult. in one of the private dining rooms of the Belvedere Hotel in that city. The principal address of the evening was made by the guest of honor, W. H. Matthai, who is secretary of the company and manager of the Baltimore branch. The other speakers were W. L. Stansbury, E. J. Magers and Geo. H. Harper. Albert S. King was toastmaster.

# Letters from Wholesale Hardware Merchants on the Outlook for Trade in 1905.

*We give below some special advices for which we are indebted to jobbing houses throughout the country in regard to the business situation and the prospects for trade during the year on which we have entered. These reports, together with those of our regular semimonthly correspondents, which will be found on preceding pages, will give a broad and detailed view of the markets of the entire country and will be of exceptional value as reflecting the judgment of houses of recognized position and ability who are in close contact with the conditions existing in their respective territories, some of which cover a very wide field.*

### SIMMONS HARDWARE COMPANY, St. Louis.

The outlook for business in 1905 is so exceedingly promising that it is almost too good to be true. We believe that there has not been anything so cheering in the industrial world since the great boom in '99. We feel that there are logical grounds for this belief. The crops as a whole are large and are bringing remunerative prices, for, despite our great manufacturing and mining interests, it is still true that agriculture is the basis of prosperity in this country. The tillers of the soil are as a rule out of debt and have money to spend. It seems therefore that there must naturally be a large demand for goods of all kinds. While it is true that the wheat crop is short in quantity, we believe the increase in price more than makes up for the difference. The purchasing power of the raiser of wheat has been, if anything, increased, so that he will buy freely, thus adding to the movement of merchandise. Then, again, the corn crop is so large that it more than makes up for the shortage. In this connection it must be realized that the farmers are indulging more and more not only in the necessities but in the luxuries of life; that Sewing Machines, Bathtubs, telephone connection, good furniture and the like, are now almost necessary adjuncts to every farmhouse. The transportation lines will naturally profit by the large crops and the great movement of merchandise, and it is an old story that the prosperity of the railroads is a reflection of the general prosperity of the country. The iron and steel industry has long been considered the barometer of the country, and it certainly is to-day on the high road to good times. The demand is enormous, prices are steadily advancing and the end is not yet. Money is plentiful and cheap and confidence in our financial condition is deep and widespread. One of the most significant signs of prosperity and the ease and abundance of money is the fact that the percentage of dealers discounting their bills for cash has increased very largely over previous years. Few things are more encouraging than the reports which come to us from our army of salesmen, who practically cover the entire country, as to the increase in the intelligent, enterprising and wideawake way in which the Hardware dealer is conducting his business. The many articles which have appeared in *The Iron Age* of an educational character are now beginning to bear fruit. Dealers have masticated and digested the numerous practical suggestions which have appeared in the columns of your paper, and the result is apparent in the more intelligent administration of their business. Good work in this direction has been done by the jobbers, not only those in the association, but by the large independent, outside jobbers, who for years past have labored in a persuasive way with manufacturers not to encourage catalogue houses, but to make them pay retail prices, so as to protect the retailer, who is the best friend of the manufacturer and jobber. A little item is the attractiveness of the show windows full of handsome goods, where formerly cobwebs and dust held sway. Dealers have found advantage in handling one good line—not so much variety and not so much mixture, like Joseph's coat, nor buying from each traveling man who came along just because he happened to be "a good fellow," although his line was not all right, but centering on goods of standing and quality that gave satisfaction. Experience shows that cycles of good and bad times succeed each other in regular succession; only of late years the period of hard times does not seem to last as long as formerly. Part of 1903 and practically all of this year were times of conservatism, reduced purchases and economies. Now we seem to have started uphill, mostly on a solid foundation, and at present we are unable to detect any cloud in the sky.

**Exceedingly Promising**

**Large Crops Good Prices**

**Railroads Prosperous**

**Bearing Fruit**

**Show Windows**

### HIBBARD, SPENCER, BARTLETT & CO., Chicago.

The general conditions that have prevailed in the country during the closing year are fairly reflected in the amount of business done by the wholesale Hardware trade of Chicago. There was a shrinkage caused by the stoppage of purchases and the wholesale reduction in the number of employees by the railroad companies. The frequent and violent labor disturbances also in a great degree lessened the production of manufacturers, retarded building and discouraged the promotion of new enterprises. The good feeling engendered by the prosperity of previous years carried the Hardware trade along with increased sales well toward the latter part of spring, when the above unfavorable conditions made considerable inroads upon business. In the early fall conditions were very much improved, and with the prospect of good crops the tide turned upward, and the year is closing with a remarkable gain, both in the city and country, and a very much better feeling is prevailing in the entire Northwest. On the whole 1904 has been a favorable year, and the total business should show a comfortable increase, and experience leads us to believe that conditions point to a more favorable season in 1905.

**Labor Troubles a Deterrent**

**Tide Turned in Fall**

### THE EMERY-WATERHOUSE COMPANY, Portland, Maine.

We are looking forward to the coming year as one of the "red letter" years of the business. Conditions seem to be favorable for a good demand for Hardware, and we trust the manufacturers will not advance prices beyond a reasonable limit. It is much better for all concerned that the prices should be kept as low as possible. Of course we must all expect slightly higher prices, but we do not look for heavy advances, and we certainly wish this may be so. If prices advance too much it is very apt to discourage the buyer and cause many proposed improvements to be laid over until prices are more reasonable. It seems to us good business judgment to carry full stocks, but at the same time these stocks should not be too large, as we do not feel this is any time to speculate. This applies with fully as much force to the retailer as to the jobber. There certainly is not much to fear from shrinkage on anything that would be used before July 1, and by having full stocks all are able to take care of the demands that are made upon them. We know it to be the policy of some of the largest corporations to keep the advances within reasonable limits, and this we look upon as one of the advantages to be

**Red Letter Year**

**Full Stocks Desirable**

gained from present methods over the old systems of having many small manufacturers, some of whom are obliged to realize on their goods in order to meet their obligations, even if it has to be done at a sacrifice; and while, perhaps, the buyer cannot make as much money in a short time as was possible under the old conditions, yet in the end we feel he is better off, because the fluctuations are less violent and prices more stable. While there may be some disadvantages from these large aggregations of capital, yet there certainly are many advantages that we must not overlook. We heard a very good reason in a speech, the subject of which was "The Trust and the People," why these large trusts should be forced to make public statements of their condition. The illustration was: "That the common house cat sitting on the hearth was a very peaceable animal and would not alarm the most timid; but grow the cat to the size of a tiger, and we should feel that it would be a good plan to file the claws and use a muzzle." This seemed to us a very apt illustration of what we have to fear from these large corporations more than from the ordinary manufacturing business. At the present time the only cloud on the horizon seems to be the great lack of water throughout the country, and we certainly hope there may be heavy rains before the winter closes in.

**Keep Advances Within Reasonable Limits**

**Cat or Tiger**

### THE CONGDON & CARPENTER COMPANY, Providence, R. I.

Our immediate market at the present time and during the past year has felt severely the disturbance due to the anomalous conditions in the cotton industry—first an excessive cost of the raw material, then a sudden slump in the same. Providence is a cotton manufacturing center, and our machine shops consuming iron and steel are largely engaged in building cotton machinery, so we are anxiously looking for better conditions in cotton goods to reflect a larger demand for our material. We believe it is coming and we look for a good business in 1905.

We believe we will see prices on a higher level the next five years than heretofore, though the pendulum will swing meantime as it always has. Gold, our medium of exchange, is becoming year by year more plentiful, and its purchasing power proportionately less, especially as affecting the labor market.

The cost of iron and steel from the ore and coal in the ground to the finished product is very largely represented by labor, and only a series of bad years can reduce this important cost item. Nothing on the horizon indicates bad times, hence it seems fair to infer that a higher average of cost will be obtained.

The recent advances may have been discounting the future somewhat, perhaps based more on sentiment than actual demand, yet the real demand seems to be in sight, and no combination has yet proved big enough to controvert the axioms learned in our childhood pertaining to that ancient and inexorable law of supply and demand.

**Cotton Influence**

**Prices on Higher Level**

### WEED & CO., Buffalo.

Last year our city was still reaping the benefits of the Pan-American Fair, which gave a number of our visitors an opportunity to appreciate the advantages which we have in favor of manufacturing interests. With our railroads and lake shipping facilities and the electric power from Niagara Falls, it has been the means of a large number of outside manufacturers locating here, and in addition the Lackawanna Steel & Iron Works is now in operation, which, we believe, has no equal in this country consequently there has been no surprise that the business of our city has been greatly benefited. We can see no reason at present, with the conditions and the good feeling existing throughout the country, why the coming year should not prove even more successful than the year of 1904.

**Benefiting from Exposition**

### ALBANY HARDWARE & IRON COMPANY,[1] Albany, N. Y.

The business situation in this section is similar, we think, to that throughout the entire country at the present time—very satisfactory. The stability of prices, with every indication toward higher values, as shown by the action of the large makers of base materials of late, gives tone to the market, establishes confidence with the dealers and consumers, and has a stimulating effect throughout the entire line of trade. On this basis we confidently look for a large volume of business for the coming year, and believe that the merchants generally are making preparations in anticipation of it.

**Stimulating Prices**

### MATHEWS & BOUCHER, Rochester, N. Y.

In our opinion the prospects for Hardware trade in New York State for 1905 are good. The local conditions here are favorable of course, because there is considerable building being done because of some factory extensions and also to repair the gaps by the great fire of February last. Furthermore, we think the farmers of our State are in very fair shape, that the results of this year have been reasonably satisfactory, and that they will be in position to buy Hardware in 1905. Probably the slight advance in prices will have a stimulating effect also, and for at least the first six months of 1905 we anticipate a good trade.

**Farmers Prosperous**

### BINDLEY HARDWARE COMPANY, Pittsburgh.

Concerning the business situation and outlook prospects are exceedingly bright from our viewpoint—in fact, conditions now are very much better, judging from this month's business, than they have ever been with us, the December business showing a very large gain over any December we have ever had. We are making great preparations for a large business, and feel sure that our anticipations will be fully realized. In our estimation prospects are excellent in every particular for a very large business during 1905.

**A Large Gain**

### BIDDLE HARDWARE COMPANY, Philadelphia.

The trade situation seems unusually strong. There has been a large buying movement throughout the fall, but with the possible exception of Nails and Wire we do not see any indications of speculation, and the goods bought appear to have been ordered for normal and regular consumption. We are also forced to the belief that stocks are light, owing to liberal buying and freedom from speculation. Salesmen are now coming into the store for their annual overhauling, and almost without exception report fair prospects in their various sections. The market is unusually strong. Advances in many lines are being constantly reported, and all indications seem to point to a fair trade in the early part of 1905.

**Market Very Strong**

### LOGAN-GREGG HARDWARE COMPANY, Pittsburgh.

The year 1904 is history; 1905 prophecy. The history tells of rather a lean year for the Hardware trade compared with the preceding five, but the closing months are full of promise for improvement. One year of reaction after five of prosperity is a short time compared with former dull periods lasting three to five years, and can be borne with equanimity. As to 1905, everything points toward a big year's business. The country at large is in condition to carry forward large enterprises and use large quantities of manufactured products. Prices have reacted from the low point reached last summer and are now upon a paying basis. The furnaces, coal and coke works and mills are filling up with orders, some lines having their order books filled for the first half of the year. Stocks carried by retailers

**Large Business in Prospect**

are light, so that demand will be good as soon as the wage earners accumulate something after their idleness of the past year. Barring some unforeseen disaster, we confidently expect a large business this year for all lines of trade.

### F. P. MAY & CO., Washington.

The year now about to close has been the greatest from a business point of view in our history. Even at this late hour of the season our people are buying freely, and some goods that are much in demand at the present time are hard to get. The feeling that prices will be higher later on has the effect of stimulating buying, and the outlook to us is very bright, indeed, and, while here and there there may be depressions brought about by local causes, we believe on the whole business will be very good. No condition exists that we are aware of that will have a tendency to retard trade. Therefore we expect and trust that the greatest measure of prosperity will be one of the blessings that will attend us during 1905.

**Very Bright Outlook**

### THE McINTOSH HARDWARE CORPORATION, Cleveland, Ohio.

In our opinion the outlook for trade for 1905 is excellent. We look for a good business and at a higher range of prices than exists to-day on nearly everything.

### THE BOSTWICK-BRAUN COMPANY, Toledo, Ohio.

Our trade during the past 30 days has been most satisfactory. Conditions have been such that there has been a real demand for Hardware. We find very little speculative buying. Conditions for spring trade look very favorable. We believe we will have heavy demand, especially for Builders' Hardware and building material.

### THE SMITH BROS. HARDWARE COMPANY, Columbus, Ohio.

With the closing of the year it is well to consider what the results have been. Personally, we have no complaints to make. While the volume of business has not been quite up to last year, it has been a good year. Prices have not been badly demoralized by manufacturers. (We cannot say as much for jobbers.) Advances have pretty well balanced declines. Failures have been few among Hardware dealers, indicating conservatism and a profitable year. Retail dealers are learning that it is not necessary to buy goods by the carload or by the gross, as they can buy in safe quantities from their nearby jobber on as favorable terms and get the goods in a day or two. In this way it requires less capital and less risk. If goods advance a little they can easily get the advance and make their usual profit, and if they decline they do not lose much, as they are not overstocked. Some dealers tell us they turn their invested capital as many as six times in a year. That pays better than loading up with stock enough to last six months.

**A Good Year**

The outlook for 1905 is good as far as can be judged by present indications. Everybody seems to be sanguine that next year will be a record breaker, and we agree with them; but we all know that there are many things that can happen to retard business. We must have good crops, busy factories and plenty of private and public improvements to make good business. High prices may interfere with improvements, and the nightmare of labor troubles is always with us. If we were assured of good crops, moderate prices and harmony between employer and employee we could feel assured of good business. It is not well to be pessimistic, so we will not try to cross a bridge until we get to it. The country is certainly in a most prosperous condition now and seems to be anxiously waiting to set the wheels going in the new year. We hope there will be no slipping of cogs to interfere with what now promises to be an exceptionally good one.

**Sanguine Hopes**

### VAN CAMP HARDWARE & IRON COMPANY, Indianapolis, Ind.

We consider the conditions very favorable. Stocks in the hands of retailers are not large, and every one is looking forward to a good business. Prices are advancing on many lines, but we do not believe this tendency will grow to such an extent as to encourage speculation, and it would be, indeed, unfortunate if it did. We believe the situation to be sound, and business is always better on an advancing market.

**Situation Sound**

Our advice to the trade is to have their orders for spring goods shipped as early as possible. If you have not placed your orders for Wire Cloth, Poultry Netting, Screen Doors, Ice Cream Freezers, Lawn Mowers and Steel Goods, we think it would be wise to do so and specify for shipment at the earliest possible date. Manufacturers are loading up with orders, and we do not look for declines on any of the above articles.

Collections have been improving steadily ever since election, and money seems to be plentiful. We are receiving very few requests for extension of time, and many customers are discounting now who did not before. Altogether, the year just past has been one of decided advancement in our institution, and we look hopefully forward to 1905, believing it will bring us all good tidings of success achieved.

**Much Discounting**

### BŒTTICHER-KELLOGG COMPANY, Evansville, Ind.

The year just drawing to a close has been in the main satisfactory. Money is plenty and collections are good. Farmers having had good crops at good prices, conditions cannot well be different. The outlook in this territory for 1905 is good, and with another good crop next season prosperity will be continued for another year at least.

### WELLS & NELLEGAR COMPANY, Chicago.

We look upon the business outlook for 1905 as most promising. We have already booked more orders for seasonable goods than ever before in the history of this business, and we are preparing to handle a large increase of trade in every department. Every indication points to continued prosperous conditions throughout the West, and with the rapidly increasing population we feel that the demand for goods will far exceed the supply. Merchants who place their orders early will have every advantage in not only receiving their goods on time, but also before further advances take place, which are sure to follow.

**Demand Will Exceed Supply**

### TENK HARDWARE COMPANY, Quincy, Ill.

Our business has been fully up to our expectations during the past six weeks, and from what we learn the other jobbers and manufacturers in this city are having the same experience. The outlook for business during the first half of the next year is very good. The farmers in our section seem to be prosperous; almost all of them have had crops that averaged very well, for which they are now getting very good prices. Taking all into consideration, we feel that the outlook for business in this section during the first six months of 1905 is very good.

**Outlook Good**

### MORLEY BROTHERS, Saginaw, Mich.

The general outlook for business in Michigan is much better than a year ago. Crop conditions have averaged better than for the past several years. Immediate requirements of the retail merchants are considerably heavier than they were last December. Spring buying has started in early, and there seems to be a marked feeling

of confidence in a large volume of business and better market conditions for the season of 1905. In talking with one of our neighbors a few days ago we made the inquiry: "How do you find business?" and he replied, "Markets are firm and salesmen weak." We presume he meant his own men. Michigan has the reputation of being a very closely covered territory, which possibly accounts for his remarks.

**Markets Firm; Salesmen Weak**

### FLETCHER HARDWARE COMPANY, Detroit, Mich.

We feel very much encouraged over the outlook for business for the coming year, 1905. Our men are all sending in very handsome orders for spring delivery and report that the indications are that the coming year will be an unusually good one.

### CLARK-RUTKA-WEAVER COMPANY, Grand Rapids, Mich.

As regards the business situation in western Michigan, we believe the outlook for spring and early summer trade to be very fair; in fact, we are looking forward to an extra good trade. The stocks generally are not heavy; there is a slight drawback in the low price being paid for potatoes, which at this time of the year is an important item in this territory. But the quantity of potatoes offered is enough to offset or nearly so the low price, and farmers are feeling very good.

**Stocks Not Heavy**

### SICKELS, PRESTON & NUTTING COMPANY, Davenport, Iowa.

There are many reasons which justify the prediction of a great improvement in business during 1905 as compared with 1904. Among these reasons are abundant crops, commanding unusually high prices; plenty of money, depleted stocks in the hands of dealers, Hardware prices firm and advancing. The depressing effect of the ruinous decline in stocks of 1904 and the Presidential year have passed, weeding out the few financially weak and profligate and restoring confidence in the many who are strong and conservative; the old and long standing accounts have been settled and the new year begins with comparatively clean slates. There is an absence of friction between capital and labor and a growing tendency toward amicable settlements in the place of lockouts and strikes. A disposition exists to accept, no matter how undesirable, the principle of concentration, combination, pools and trusts as permanent conditions, and to meet them by friendly organizations, and there is also a growing sentiment in favor of legislation that will control and eliminate the evils of some of the grasping and gigantic corporations. The policies of the Government are established, well understood and have recently received the indorsement and approval of our people. There are many other general and local reasons that certainly warrant the forecast of great business prosperity in the year 1905.

**Abundant Crops; High Prices**

**Capital and Labor**

### KNAPP & SPENCER COMPANY, Sioux City, Iowa.

The condition of business in this territory is fully up to expectations, the volume probably exceeding that of last year, largely due to better crops and higher prices. The advance of prices has stimulated to some extent placing of future orders for early spring shipment. The outlook for trade during the first half of 1905, we believe, is encouraging; that for the latter half will be determined by the conditions of the then maturing crop. Stocks in the hands of the trade generally are light; building operations for the past two years restricted, now show visible signs of more activity. Congress by making appropriation for irrigation of the unproductive lands in the West will aid largely in the development of a now sparsely settled territory, which must prove of great benefit to all classes of trade. It is well, perhaps, in these times of lightning changes not to build too confidently on future prospects, as records of the past do not always show realization. We can safely say, however, that the outlook for 1905 is better than it was this time last year for 1904.

**Irrigation**

### HACKETT, WALTHER, GATES HARDWARE COMPANY, St. Paul, Minn.

In a broad sense the prospects for business next year are of the best, due to the fact that our Government will not change hands on March 4, 1905, thus causing the capitalist and large corporations to have faith that the present value of things material will continue to exist, with a possible chance of increase. Already the business placed and in sight for next year exceeds that of any other. The advances already made have caused a feeling of possible further advances, and this is making the dealer place orders for spring delivery. Our own section did not have a first-class crop last fall, but prices ranging high has brought the average amount of money into circulation, though some small sections are very poor because of an utter lack of crops. We feel that if nothing unusual happens the year of 1905 will be a banner year.

**Further Advances**

### BARKER-JENNINGS HARDWARE COMPANY, Lynchburg, Va.

For the past 60 days trade has been quite active and the demand, especially for Heavy Hardware, has been unusually good. Buying has been stimulated by the stiffening of prices. The general conditions in our section are very favorable; crops have been good and are bringing satisfactory prices. The lumber, iron and coal trades are all looking up, and the demand and prices are greatly improved. We can see no reason why we may not expect a satisfactory business, at least for the first six months of 1905. With a few exceptions prices of iron and steel products are reasonable, and it is to be hoped that the manufacturers will be conservative and not attempt to make abnormal advances, which would have an unfavorable influence on business. We will be glad to see a steady market and only such advances made as can be fully sustained. The general feeling is good, and the outlook for a satisfactory business is encouraging.

**Crops Good; Prices Ditto**

### OTT-HEISKELL HARDWARE COMPANY, Wheeling, W. Va.

The outlook in agricultural sections is very unpromising, due to an unequaled fall and winter drought covering a large area, where there has been no rain for practically five months. Many seasonable goods, as Screen Doors and Windows, Refrigerators, &c., have been carried over, owing to a cool summer. In the coal regions and manufacturing centers conditions are very good. Summed up, we look for only a moderate business the first half of the year.

**Drought Has Hurt**

### KING HARDWARE COMPANY, Atlanta, Ga.

This year our business shows a gain of over 20 percent., and during the last two months even a greater percentage of gain. We have never passed through a more prosperous season than the present, but we do not know how long the conditions will remain as they are, as the sudden drop in cotton has depressed the farmers and merchants somewhat, but the low prices affect more particularly the well to do farmer and merchant, rather than the poorer classes; the latter, having sold their cotton early at high prices, paid their debts and had a little money left over. Generally speaking, we would say that the conditions have never been more favorable than at the present.

**A Season of Prosperity**

### MOORE & HANDLEY HARDWARE COMPANY, Birmingham, Ala.

Since the dull period in the summer months the reaction has been decided and active, and the prospects for the first half of 1905 are encouraging. The advance in iron and steel and also lumber seems to have stimulated the demand, and stocks are being enlarged with confidence. The sudden drop in the price of cotton has retarded sales and collections among those who still have cotton to sell, since they are unwilling to accept the present price for their cotton. The South is in better condition than it has been for 30 years. Our banks have better deposits, our farmers are freer from debt and have some money to spend, besides having more corn, hay and products that constitute the staples of living. Hence they are inclined to buy better houses and have better improvements generally. The railroads are extending branches, developing mines and other industries. This gives the railroad contractors work, and gives an outlet for supplies, all of which helps trade in the Hardware line. The Hardwareman is usually the first called on when ground is broken for a new industry or a house is built. The architects are busy and hopeful that the good time will continue, and, save the discouragement of the farmer, which we will hope is temporary, our section is prosperous and contented. The South furnishes a good field for investment and bids fair to take her normal place with the favored parts of our great country.

**Reaction**

**Railroads Extending**

### LEE RICHARDSON & CO., Vicksburg, Miss.

We certainly look for a good winter and spring trade, and think the conditions of the country warrant us in this expecation. First, that we have had abundant and good crops in this territory, which are bringing good prices, and the merchants and farmers are in good shape financially, which cannot help but mean more liberal buying and good collections. Whatever may be our feelings in regard to the result of the national election, there is but little doubt that the election was the settling egg broken into the coffee. It has clarified and settled the whole situation. Uncertainty is apparently at an end, and the whole country has seemingly made up its mind that "there's a good time coming," which we hope will prove to be true. The market is reflecting the general condition, and advances in price are announced almost daily, while extreme quotations on other lines are being rapidly withdrawn. The advance in Nails and Wire is of course well maintained, and rumors of further advances are current. It is to be hoped that the feeling of buoyancy will not run too high, for conditions do not appear to justify a sensational advance, and we believe that a safe and prudent course is more likely to bring satisfaction in the end. The general trend of trade is now in the direction of Holiday Goods and Guns. Ammunition, Carvers, Pocket Knives and fancy goods are in urgent demand, and it is gratifying to see that consumers will apparently have the money to spend this year for such lines.

**Abundant Crops; Good Prices**

**Uncertainty at an End**

**Prudent Course**

### LOUIS HOFFMAN HARDWARE COMPANY, Vicksburg, Miss.

In this immediate section Hardware business is fair. There is a great deal of building being done at present, and there is no reason to suppose that the trade should fall off in 1905; so we expect a good trade in 1905.

### J. H. FALL & CO., Nashville, Tenn.

Business with us and in this immediate section is unusually good for this season of the year, and all indications point to a splendid business for the year 1905, as this part of the country and, in fact, the whole South, was never in a more prosperous condition than at present.

### MAGILL HARDWARE COMPANY, Chattanooga, Tenn.

The business situation in Chattanooga and the territory adjacent is regarded as favorable. Chattanooga is pre-eminently a manufacturing city and is adding year by year many new industries. The climate, freedom from labor troubles, close proximity to all kinds of raw material and favorable rail and water transportation make this an ideal city for manufacturing purposes. With manufacturers growing in prosperity and numbers there comes an increasing demand for Hardware supplies of all kinds. In addition to this the surrounding country has been blessed with good crops. The "peach belt" reaches almost to our doors and this crop was unusually large. The extensive coal and iron interests in and about us are busy. Taking it all in all the prospects for this section in 1905 look hopeful and encouraging.

**Manufacturing Center**

### WOODRUFF HARDWARE COMPANY, Knoxville, Tenn.

Everything in this section is exceedingly prosperous. The new railroad building has made business very good, indeed. The Louisville & Nashville Railroad is building a line through this point which goes through the richest coal fields in this section of the country. The marble business, which is important, seems very prosperous. Crops have been good, and we can see no reason why every one in this territory should not enjoy a very prosperous year in 1905.

**Exceedingly Prosperous**

### WOODWARD, WIGHT & CO., New Orleans.

The Hardware business in New Orleans is dependent upon the prosperity of cotton, sugar, rice and lumber; also the export trade of Central America and Cuba. The cotton people have made one of the largest crops in history and have marketed a fair part of it at a very good price. They have paid off almost all their liabilities within the past few years and are in better position now than they have been since the war. It is doubtful if they will make anything on this year's crop marketed from December 1 on, as it was made on fairly high cost of material used by cotton planters, but the whole crop itself should net them a very much better profit than they have been getting for 10 years past, except during last year.

The rice industry is in very bad shape, and there will not be a great amount of business from that section, but the sugar people are doing better than they have done for five or six years past, and they should more than make up for the loss in the rice territory.

The lumber people had a bad six months for the last half of 1904, but their prospects for the first half of 1905 are that this will be one of the finest six months periods they have ever had.

Cuba is gradually consuming more and more from New Orleans, but there is still really no large volume of business done with this island, but the increases year by year justify our considering it as a coming outlet for a great deal of Hardware and agricultural goods.

The Panama Canal, when its builders finally get down to a definite basis of work, will consume an enormous amount of Heavy Hardware and building material, especially in the lines that can be galvanized and thus prevent the enormous wear due to their very damp climate. While New York will get a great deal of this trade, yet, with changed quarantine conditions, and with the steamship lines projected, New Orleans will be in position to handle a very large amount for the isthmus.

As a whole we expect the first six months of 1905 to

**Cotton**

**Rice, Sugar, Lumber**

**Cuban Trade; Panama Canal**

be in Shelf and Heavy Hardware as good if not better than any period New Orleans has ever seen, and the particularly attractive feature about it is the demand for a good grade of goods, which argues more for prosperity itself than any statement of bank clearings or any set of financial statistics. The old days when anything was good enough for the consumer in this territory are past, and the quality of goods is now looked into much more than the price.

**Quality Important**

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### ROBINSON BROS. & CO., Louisville.

We cannot help but note the optimistic tone of the market as illustrated by an incident which took place in our office yesterday. One of our customers, a Hardware merchant from a nearby town, upon being asked how he regarded the prospects for spring trade, answered that in all his experience he had never been more prosperous that at present and the coming months indicated that trade conditions would be most favorable. The long drought, which affected a large part of our territory, did no serious damage, in spite of prophecies to the contrary, although a great many farmers have been inconvenienced by being compelled to haul water, and shipping interests have suffered by reason of the unnavigable condition of the streams. The demand for Holiday goods has gone far beyond our expectations, and our future order file looks comfortable with nice orders booked for February and March shipment. We see only hopeful signs for the future.

**Optimistic Tone**

**Hopeful Outlook**

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### RICHARDS & CONOVER HARDWARE COMPANY, Kansas City, Mo.

Present trade conditions in the territory tributary to Kansas City are somewhat unusual for this season of the year. Up to the present time there has been practically no cold weather; consequently trade has been lighter than usual on seasonable goods. This, however, has been more than offset by the demand for goods used in building operations, which have been uninterrupted, due to the open season. Furthermore, the trade coming from the new oil and gas fields in southeast Kansas and the Indian Territory has done much to create a good, healthy demand for Hardware and kindred lines.

**Trade Light on Season Goods**

As to the future, we cannot anticipate beyond the first six months of 1905. The prospects seem fair for active trade during the first half of next year. We anticipate that the strong upward tendency of the market will do much toward making a good, active demand during the first six months of next year, although this may be offset somewhat by the condition of the winter wheat crop, which in this territory is not in as good condition as it should be at the present time, due to lack of moisture during the fall. On the whole we will go into the new year with considerable confidence, and can see nothing at the present time which looks anything but encouraging.

**Upward Tendency**

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### FONES BROTHERS HARDWARE COMPANY, Little Rock, Ark.

The outlook for business in 1905 is encouraging from our standpoint. At the present time there is somewhat of a depression owing to the low price of cotton, and the tendency is not to place any on the market until there is an upward move. In a number of cases the holding of cotton is causing a falling off in business and a shortage in collections. Outside of this one feature the condition of Arkansas is very prosperous. Immigration is increasing and likewise acreage, which means the sale of more Hardware and Agricultural Implements.

**Immigration and Acreage Increasing**

### FOX BROTHERS HARDWARE COMPANY, Pine Bluff, Ark.

Our knowledge of trade conditions is comparatively local, as our territory is confined to what is known as southeastern Arkansas. Up to the recent decline in cotton business was moving along smoothly, both as to sales and collections. When the drop came the man who had the cotton seemed to want to keep it, and the customer who usually wants goods has concluded that he does not want them, making both trade and collections dull. We hope that these conditions will find their level, either by moderate reaction of the price of cotton or that the parties holding it will find that they must turn loose at the present price, and thus trade conditions be improved. At present we feel, however, that one word expresses about all there is to say and this is dull.

**Cotton a Factor**

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### MORONEY HARDWARE COMPANY, Dallas, Texas.

The business situation in north Texas has been better than usual up to the present time. On account of the slump in cotton and the advance in prices generally trade has slackened to some extent. Farmers and merchants generally are looking for a good spring trade.

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### ED. STRAUSS, Waco, Texas.

I am glad to inform you that business conditions in central Texas at this time are favorable. All crops, except fruit, such as corn, cotton, hay, oats and wheat, were successful. The prices on all kinds of farm produce, including butter, eggs and poultry, have been ranging high above the average. Consequently farmers as a class are in excellent financial condition, although the recent decline in cotton has caught a number of speculative farmers and merchants. The larger portion of the cotton crop, at least two-thirds, was sold at high prices. Of course the business of the year 1905 depends largely on the condition of the coming crop. Here in Texas we usually have either a feast or a famine. No one can foresee which the next year will be.

**Large Crops at Prices Above Average**

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### THE HOCKADAY HARDWARE COMPANY, Wichita, Kan.

Southern Kansas and Oklahoma raised 75 per cent. crop last year, the good prices of which made business about normal. As for 1905 it is hard to forecast, as a 30-day dry spell at any time might make a very material change.

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### W. A. L. THOMPSON HARDWARE COMPANY, Topeka, Kan.

The prospects for a good business year for 1905 are very encouraging. Our people are prosperous, and a general improvement seems visible throughout the State.

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### THE A. J. HARWI HARDWARE COMPANY, Atchison, Kan.

We feel that this section of the country will enjoy a continuance of the prosperity of the past four or five years. While both the wheat and corn crops were short this year, the price at which the surplus was sold was so much higher than in previous years that about the usual financial returns have been received from the sale of same, and the agricultural community is in very easy and comfortable shape and is able to supply its wants without any trouble. In addition, the development of the gas and oil fields of this State is adding much to its wealth, and the improvements going on in that part of the State are very encouraging. In our own town we have developed one of the finest coal mines west of

**Oil and Gas Fields**

the Mississippi River and it is creating a very hopeful feeling all over this section. Taking it all in all we see no reason why the trade west of the Missouri River should not be very satisfactory for the coming year. Prices on Hardware are firm and there is no prospect at this time of any reaction.

### ARMSTRONG HARDWARE COMPANY,
**Oklahoma City, O. T.**

Business conditions throughout this section are not favorable, caused by the continued dry weather and the drop in the price of cotton. If we are favored with sufficient rainfall and a decided advance in the price of cotton, conditions will be exceedingly favorable. Quite a large percentage of the cotton is yet in the hands of the producers and merchants, and without advanced prices to give them relief it will stagnate business. Yet if we have our usual rainfall we will enjoy a fair business based on the wheat crop and other products. It nearly always rains here when we need it.

**Dry Weather; Drop in Cotton**

### SCHWABACHER HARDWARE COMPANY,
**Seattle, Wash.**

In a general way we believe that trade conditions for 1905 and for the future in this territory will be on a more established basis than ever before. The whole country has arrived at that stage where it will not progress in jerks, but it will be a steady normal increase. This city is rapidly growing and its geographical location is bound to make it a commercial center in the Northwestern portion of the United States, and its close proximity to Alaska and the Orient will give it every commercial prominence. At the present time in this city there are being erected fully 25 new business blocks. The city is undergoing a peculiar change which is finally locating the business and commercial center.

**Trade on Firmer Basis Than Ever**

**Growth of Seattle**

### THE W. S. DONNAN HARDWARE COMPANY,
**Richmond, Va.**

Our fall business has been very satisfactory; in fact, the volume of business done was larger than last year. In our State all products of the farm have been and are still bringing profitable prices, and in consequence our country friends are in good spirits. This condition, however, does not extend through the Carolinas, where cotton is largely grown. There we find the people somewhat depressed over the low price at which it is selling, and a large number have refused to market any part of their crop. This naturally has its effect upon collections. Generally speaking, however, we think the South is in better condition than it has ever been, and we can see no cause for despondency. The ratings of the merchants and bank deposits show marked increases. If we do our part we can see no reason why 1905 should not bring prosperity to us all.

**Improved Condition of the South**

### MILLER, MORSE HARDWARE COMPANY,
**Winnipeg, Canada.**

Business during the past season throughout the Canadian Northwest on the whole has been fairly good. We have had a good average crop of wheat, oats and barley, which are our staple cereal products. Our wheat has averaged about 21 bushels per acre, and the aggregate yield during the past season was about 60,000,000 bushels. The crops being fairly good have stimulated buying in all classes of goods and have encouraged a considerable amount of building throughout the Canadian West, with the result that there has been an increased demand for Builders' Supplies and Hardware generally. Winnipeg has been growing during the past season by leaps and bounds, no less than $9,000,000 worth of buildings having been constructed during 1904. There are six exclusive wholesale Hardware houses in this city, which carry large stocks and appear to be amply qualified to handle this trade. We expect considerable immigration from the United States during 1905. The farmers in the Western States have only just begun to realize the fertility of the soil in this western country, and the remarkably low prices at which the land can be had, ranging from $5 to $15 per acre, is encouraging a great deal of immigration from the Western States. A large amount of Hardware business for spring requirements has now been booked by the Winnipeg houses. The continual advance in price of staple goods has induced a good many retail buyers throughout the West to place spring orders earlier than usual.

**Growth of Manitoba**

**Immigration from United States**

## EDWARD K. TRYON COMPANY.

THE long established firm of Edward K. Tryon, Jr., & Co., Philadelphia, Pa., has been incorporated under the style of Edw. K. Tryon Company. This is, we believe, the oldest Gun house in America, having been founded in the year 1811, on North Second street, Philadelphia, by George W. Tryon. Since its establishment the business has continuously borne the name of Tryon, havnng passed through the successive forms of Geo. W. Tryon, Geo. W. Tryon & Co., Edw. K. Tryon, Edw. K. Tryon & Co., Tryon Brothers, Tryon Brothers & Co., Edw. K. Tryon, Jr., & Co. Through all the vicissitudes of business life this firm has steadily progressed, having entered into all the various fields of the Sporting Goods business, including, during one period of its existence, the manufacture of arms for the Government and for the trade. The late copartnership of Edw. K. Tryon, Jr., & Co., which expired on January 1, was formed in 1868 by the late Edw. K. Tryon, Jr., who died on September 19 last. During his careful but aggressive management the firm grew from an exclusively Firearms house into manufacturers, jobbers and importers of every class of Sporting Goods, occupying various buildings of continually increasing size, until a few years ago the two spacious stores, 611 Market street and 10 and 12 North Sixth street, were leased by the concern, and to-day there is hardly a city or town in the country that is not reached either by their traveling men or catalogues. The new corporation is chartered under the laws of the State of Pennsylvania. We are informed that the entire subscription of stock has been taken by the surviving partners of the old firm, Edw. B. Mears, Jr., Evan G. Chandlee and Charles Z. Tryon, who become the directors and officers. The protection of the trade has always been a consideration with this house, and while conducting a very large retail business in its own city, it has always been its policy to decline absolutely to supply consumers except those resident in the city of Philadelphia.

## PFLUEGER'S FISHING TACKLE.

THE ENTERPRISE MFG. COMPANY, Akron, Ohio, manufacturer of Pflueger's Fishing Tackle, has lately installed considerable new machinery and materially increased its capacity, and is thus in excellent position to take care of next season's business. The company is now making a very large variety of goods in the line of Fishing Tackle, including Luminous Bait, Reels, Hooks, Spoons, Flies, Leaders, Sinkers, Floats, Cleaners, Stringers, &c. These are illustrated and described in its catalogue No. F23, 155 pages.

IN connection with the second annual dinner and meeting of its officers and salesmen, Stowell Mfg. & Foundry Company, South Milwaukee, Wis., prepared an attractive souvenir in the shape of a booklet, the special feature of which was the portraits presented of those who are conspicuously identified with the direction and conduct of the company's business. The dinner was held in the red room of the new office building, Charles E. Sammond, vice-president and treasurer, presiding.

## NEW ORLEANS IN 1904.

FROM A SPECIAL CORRESPONDENT.

A YEAR which began with the brightest prospects in the history of New Orleans, a year that has registered the best volume of business and the best character of business in the history of the section, is closing under a shadow of gloom, due entirely to the tremendous depreciation in the price of cotton, creating throughout the greater part of Louisiana, southern Mississippi, southern Arkansas, southwestern Alabama and eastern Texas—the New Orleans territory—a condition of affairs that the daily papers and the financiers of the section dare not hint at.

Cotton, the staple that is the foundation for the purchasing power of all the section named, save the sugar and rice and timber regions of Louisiana and Mississippi, is selling now at less than the cost of production. Each day that passes witnesses greater depreciation, and the farmers of this section are standing face to face with what will be simple ruin unless the price of cotton materially increases above its present valuation. This condition of affairs applies directly to the Hardware business; for nowhere else in all the country is the old saying more true than here, that "iron is the barometer of trade," and the barometer of the section's prosperity.

Serious as these conditions are in the outlook, few if any of the wholesale men of the section will admit the extent of the injury that will be done their trade. Many insist that the Hardware bills are bills of necessity, that the planter will have to pay from his working capital, that the merchant and the banker will have to indorse.

### A Retrospect.

One year ago cotton was selling at 12.50 cents per pound, or $62.50 per bale. Now it is selling at $32.50 per bale on the plantation. One year ago Hardwaremen were buying from the factories, filling warehouses, crowding the cars, hurrying the shipment of spring deliveries to the jobbers and smaller wholesale merchants through the country, who were eagerly selling into a tremendous territory that was feeling the first full confidence of a barely realized prosperity. The lines were running evenly. Farming implements were going out to all the country where cotton is the economic base. Phenomenal shipments of Nails and lesser building Hardware were being made. Mill supplies were running light, for the cotton crop was small; the gins were not running much, but the price of cotton was such that all the cotton country was busy—building new houses, constructing improvements, making purchases for household Hardware work, altering and changing and shifting and fitting, buying the manufactured articles wherein the better profit lies. Into western and southern Mississippi, northern Louisiana, and even out to Texas, along the Southern cotton belt line, the purchases of building and builders' Hardware surpassed anything that had been deemed possible.

Spring came on. The high prices of cotton continued, and the planters believed they were sure of prosperity. The usual spring business continued far into the summer. Only in the cane lands was business slight. About this time the lumber mills began to close down, and mill supplies slackened off to that section, but the cotton country bought, bought, bought, straight into June. Fluctuations had little effect on business. The retail purchasers wanted the goods, did not ask the prices, and the middle men came to the jobbers for the goods.

Then a turn came. The summer was well on. Through southern Louisiana the cane crops were growing splendidly. Through the cotton country the crops were better than ever before. Still, the trade had bought itself out. The market was filled to the saturation point. Implements maintained their run better than anything else, for the cane planters were filling out exhausted plantations, and the cotton men were preparing for their fall work.

In August trade was running almost a trifle behind the same time in 1903. Into September this lethargy continued. Finally the lumber mills started, after a long wait. Then the cane growers began to prepare their sugar mills for the winter business. The cotton planters began to turn over their gins. Mill supplies began to lead the trade, the volume of selling getting larger and larger every day. Building and builders' and general Hardware began to be heard from in October. Into November and then for four weeks there was what was deemed the best trade by odds in the history of New Orleans.

### The Present.

On December 4 the Department of Agriculture issued its bulletin, showing an estimate of 12,162,000 bales of cotton. For a week or 10 days the very momentum of the rush of business carried on the trade. Then the halt came. For the past fortnight there had been uneasiness, buying from hand to mouth by the jobbers, and hesitancy among the retail customers. Immediately prior to the holidays the Hardware trade was running even with the same period in 1903. Were it not for the implement lines the trade would be behind 1903, but purchases in this maintained the average.

Every Hardware house in New Orleans has run practically through the year on an increased working force, with stress arrangements to handle business. Now they are caught with great expenses and a doubtful future.

### Transportation Facilities Improved.

During the season new lines for possible business have been opened by steamship to South Africa, to the Mediterranean, to the Baltic. New ships have been put into the Central American and West Indian trade. The Frisco-Rock Island system has let $2,500,000 in contracts for the finest ship slip in the world, to be constructed below New Orleans. The Railway Navigation Company will complete its entrance to the city within the next year. Constant agitation is going on, and has been for the past twelvemonth, to persuade the New Orleans merchants, particularly the Hardwaremen, to enter the competition for the markets in Spanish America.

Such has been the year—such is the outlook. Exports during the year have been good, have grown continually, but do not yet amount to enough to change the complexion of the trade situation, which remains entirely dependent on domestic conditions. There are those who believe that this unexpected reversal of the outlook may induce New Orleans merchants to seek constant markets outside the country, thereby being no longer dependent on one market for their trade.

To the cane and rice and timber business the Hardware trade will continue without interruption. To the cotton section it will continue for 1905 at about the 1903 rate, unless something occurs to improve the outlook for that section.

## WHITE MOUNTAIN FREEZER COMPANY.

THE WHITE MOUNTAIN FREEZER COMPANY, Nashua, N. H., in its attractive and finely printed catalogue for the present season gives full and complete information concerning its products, anticipating and answering questions that a dealer might wish to ask about the merits and advantages of the White Mountain line. A cost and selling price table is given in connection with other data concerning each machine for the convenience of the dealer.

On the 1st inst. David S. Foster, in the wholesale and retail Hardware and Iron business, Utica, N. Y., was succeeded by David S. Foster, Sons & Co., Mr. Foster admitting to partnership a number of young men who have been associated with him for years and who have helped to make his business successful. The business was established 60 years ago by Thomas Foster, father of David S. Foster, who has been connected with the house for the past 30 years, most of the time as proprietor. Those who have long been associated with him and who will now become members of the firm are his sons, Gerard S. and Bernard D. Foster; Burt A. Rogers, who has been an employee for 22 years; John F. Shanley, who has served for 11 years, and Herman C. Winchenbach, who has served for 10 years.

# The New Store of Hammacher, Schlemmer & Co.

*The new store of Hammacher, Schlemmer & Co., 127-133 Fourth avenue, New York, as not only exceptionally extensive and complete, but handling large quantities of a great variety of goods, is entitled to recognition as one of the most admirably arranged and best equipped Hardware establishments in the country. In the general arrangement and in all its details it embodies the result of experience and expert knowledge and much painstaking care to secure for each kind of goods the special accommodations and treatment which, all things considered, will be found in actual practice the most convenient and desirable. While great care has been taken in determining the general arrangement there has apparently as much attention been given to the accommodation of each separate line and to the smallest details. This is seen in the various methods, for example, in which samples of goods are displayed and in the various ways in which they are attached. In view of the merit of the arrangement we begin in this issue a detailed description of the establishment, which will, we doubt not, be of much value to all who are interested in the subject of Hardware store arrangement.*

THE founders of the firm of Hammacher, Schlemmer & Co. were in business on the Bowery, New York, as early as 1848, but how much earlier the business was started is not definitely known. The business was first located at 221 Bowery, but in 1857 it was moved to 209 Bowery, where it continued until October last. A number of changes have occurred in the *personnel* and style of the firm since 1848. In 1859 A. Hammacher entered the firm, William Schlemmer being admitted to partnership in 1867; but it was not until 1883 that the firm name was changed to its present style.

In 1892 Mr. Hammacher ceasing to take an active interest, the charge of the business was left to William

WILLIAM SCHLEMMER.

Schlemmer, who is now president, treasurer and general manager. Mr. Schlemmer was born of German Lutheran parents in Westphalia, Germany, April 20, 1841. Coming to America in 1853, he began his commercial life at a salary of $2 per week, with the business with which he has since been identified, nor has he been engaged in any other enterprise. In 1893 a corporation was formed under the laws of New Jersey, but the name was not changed. From time to time additional space was required for storing surplus stock by the growth of the business, until when the corporation moved to its present location it was occupying an equivalent to 12 rooms 24 x 100 feet in the vicinity of the Bowery store.

Among the lines of goods carried are Cabinet, Piano and Builders' Hardware; Bolts, Nuts and Screws; general factory supplies and Tools for all trades. In addition to heavy lines of staples the stock has always been made up largely of specialties not usually carried elsewhere.

The corporation's principal business is supplying manufacturers and consumers direct, and for this purpose salesmen travel throughout the United States east of the Mississippi River and through a large portion of Canada. In addition a number of salesmen devote their time to the metropolitan district. There are over 175 persons employed in the store.

The company has always given special attention to the quality of the lines handled by it. Other principles observed by the company are a proper consistency in prices, due consideration for the rights of customers and willingness to right any errors brought to its attention.

### The Building.

The firm's new home is located at Fourth avenue and Thirteenth street. The transportation facilities for reaching the building from different parts of the city are excellent. The store is located within a block of elevated and subway lines and in close proximity to several lines of electric surface cars. The building, a portion of the Fourth avenue front being shown in Fig. 1, is seven stories high, exclusive of the basement. The exterior is of brick and stone, the frontage being 62 feet on Fourth avenue, with a 40-foot L facing on Thirteenth street, the latter having been added to the original building at the time the interior was rearranged for present occupancy. From Fig. 1 a good idea can be formed of the appearance and extent of the show windows, with prism glass above; also of the entrance, which is modest yet inviting, with two pairs of swinging glass doors, and vestibule between.

### Up-to-Date Appointments.

Among the modern improvements in the building is a pneumatic tube service, operated by an electric motor in the basement, having tubes extending to all floors; telephone service connecting all floors; dumbwaiters on the north and south sides of the building, one of which is shown in Fig. 32, running from the first to the seventh floor, while a freight elevator connects the basement with all floors. Electric clocks, rolling store ladders, gas and electric lights, and hot and cold water are found on all floors.

### The Different Divisions.

The first floor is devoted to the retail department, the second floor to general offices and sample room, the third floor to receiving and shipping rooms and offices used in connection with these departments, while the fourth, fifth, sixth and seventh floors and basement are used as stockrooms. The L portion of the establishment is devoted to private offices, cloakrooms, lavatories, electric passenger elevator, &c. Metallic lockers are provided for employees, also a room where the female employees may eat their lunches. Apparently everything in the way of sanitary convenience has been supplied for the comfort of the employees.

### The Retail Department.

The general arrangement of the first floor of the main building, used for the retail department, is shown in Fig.

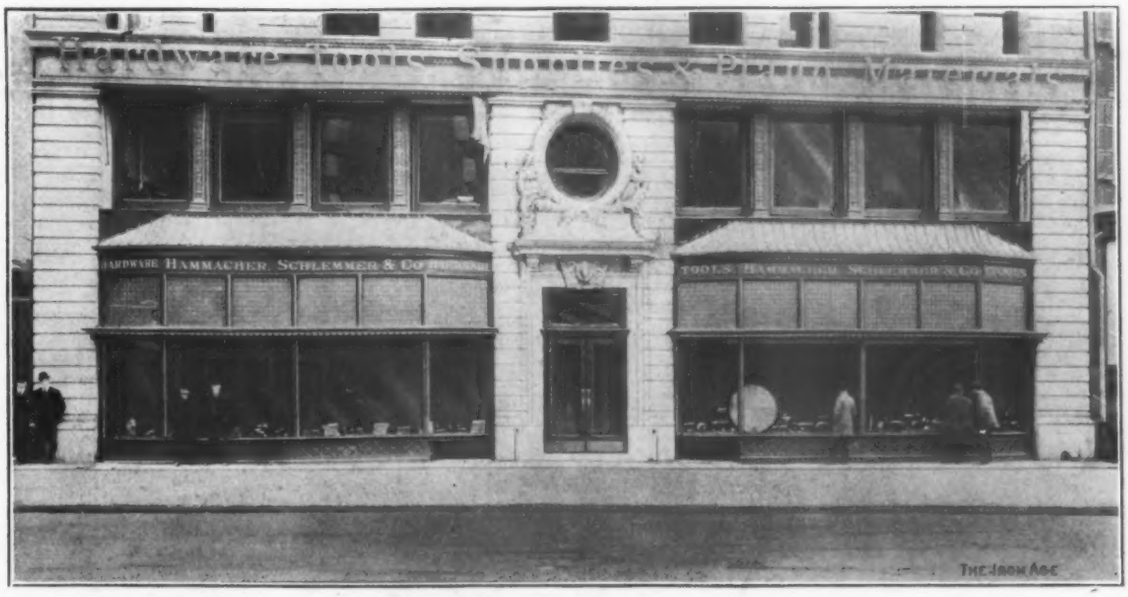



Fig. 1.—Show Windows and Front of Store Building.

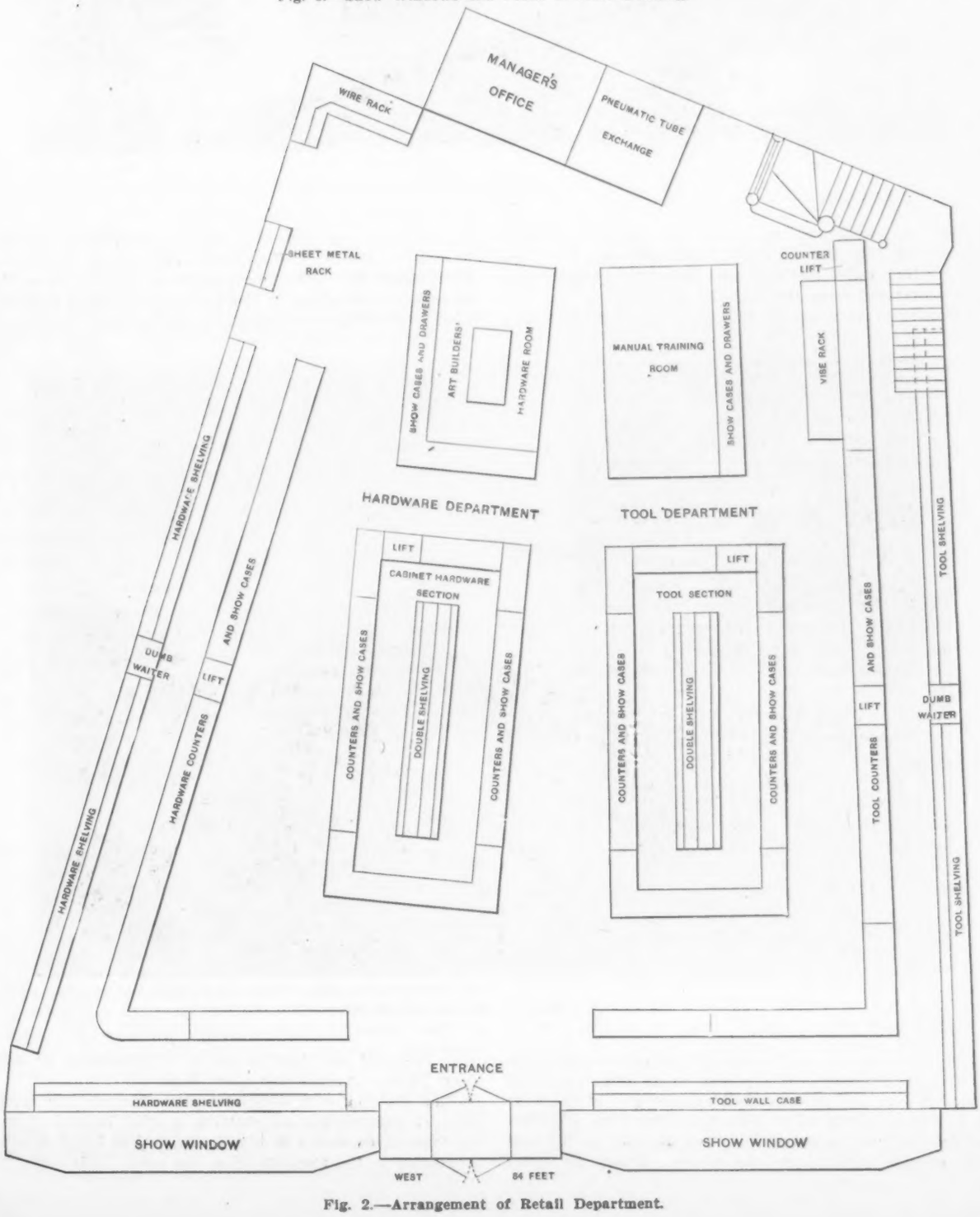



Fig. 2.—Arrangement of Retail Department.

2. The location of shelving, counters, showcases, lines of goods, rooms and offices are indicated on the plan. A view of the retail department taken from the stairway in the southeast corner, shown in Fig. 3, affords an idea

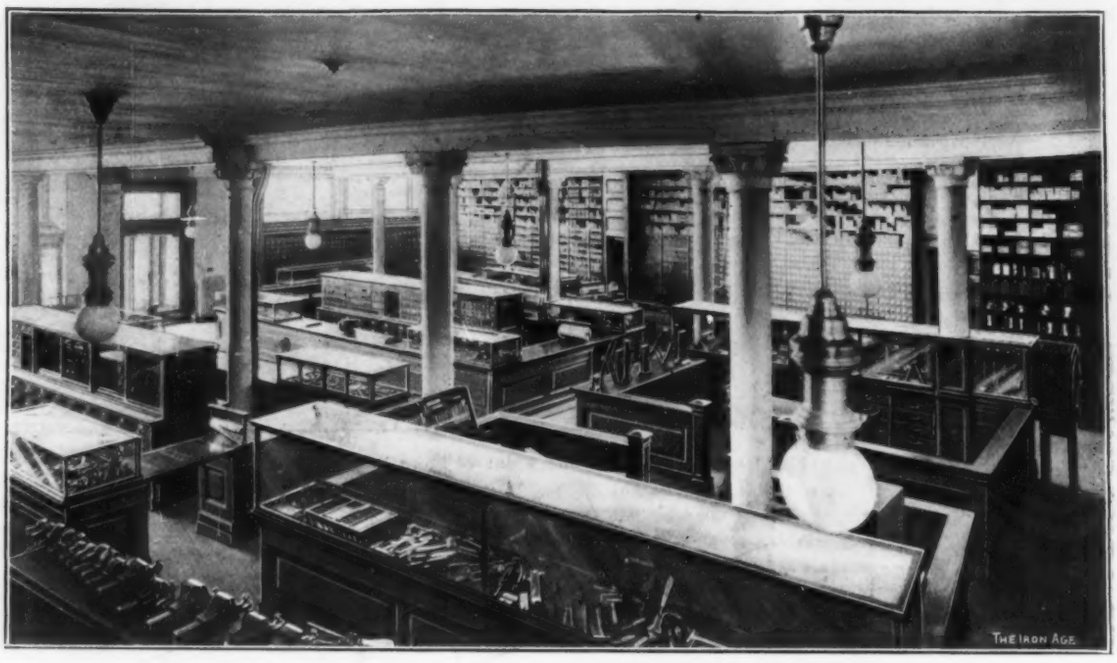



Fig. 3.—View of Retail Department from Stairway.

of the excellent arrangement of the fixtures. Except the shelving in the Cabinet Hardware and Tool sections, which is 5½ feet high, the view of the entire room is unobstructed from any point on the floor.

The room is irregular in shape, being 78 feet long on the north, 62 feet on the west, 62 feet on the south and 40 feet on the east. The ceiling is 15 feet high, and abundance of light is furnished by a stretch of about 60 feet of prism glass, 8 feet high, above the show windows on the west, and by about 35 feet of skylight on the east side of the room above the offices. About an equal amount of space is devoted to the Shelf Hardware and Tool departments, the aisle in Fig. 4 being the separating line.

This view taken from the entrance, shows the aisle and surrounding fixtures. In the Hardware department are carried lines of Shelf and Cabinet Hardware. The fixtures throughout the room were all made to order, as none of the styles in the market was found suitable. They are excellent examples of fine cabinet work, and were designed and constructed by F. Schaettler of 533 West Thirty-fourth street, New York.

Fig. 4.—View from the Entrance on the West.

The shelving and fronts of shelf drawers are solid oak. In construction all shelving is solid instead of being framed, as shown in Fig. 5, the shelves being driven into gains in the uprights from the rear. This form of

construction permits of using the shelves for either drawers or for goods in original packages. Counters and ledges are of solid mahogany, this wood being chosen because the color makes a pleasing contrast with the goods shown on it and because of the facility with which it can be scraped and repolished.

To provide a convenient passageway for salesmen and

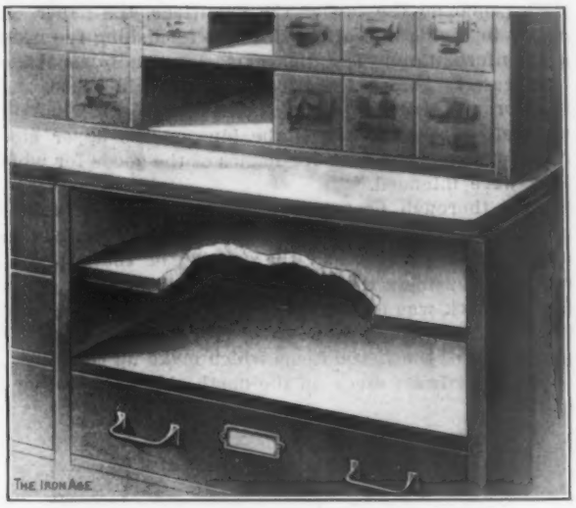


Fig. 5.—Construction of Shelving.

to exclude others there is an opening, or lift, in each of the long counters on the north and south sides of the room: also in the Cabinet Hardware and Tool sections, Fig. 2. The locations of the lifts are shown in Fig. 2, while the one in the north counter may be seen in Fig. 32. The lifts are hinged at one end so as to be raised when passing through the opening.

The shelving throughout the room is arranged on the unit system, all sections being 32 inches wide. The open-

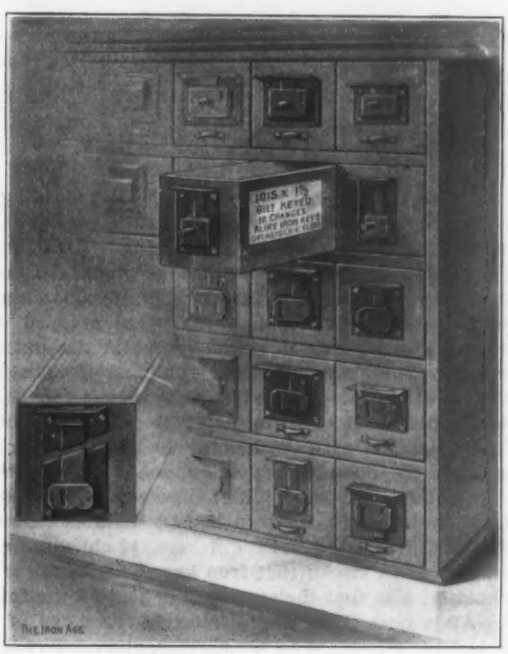


Fig. 6.—Information and Stock Label.

ings between all shelves above the ledges and under the counters are the same, to take shelf drawers 4⅛ inches high. These drawers are of a width to permit four, six or eight to be used in a section of shelving. The space between the shelves under the ledges is 6 inches, and accommodates one or two drawers to the section. This system of units permits shifting the drawers containing stock in the same shelf, or moving them to other shelves in different parts of the room.

The shelving on the Hardware side of the room is 14 inches deep above the ledge and 23 inches below. On the Tool side the shelving above the ledge is 16 inches deep and 23 inches below. The shelving back of the show

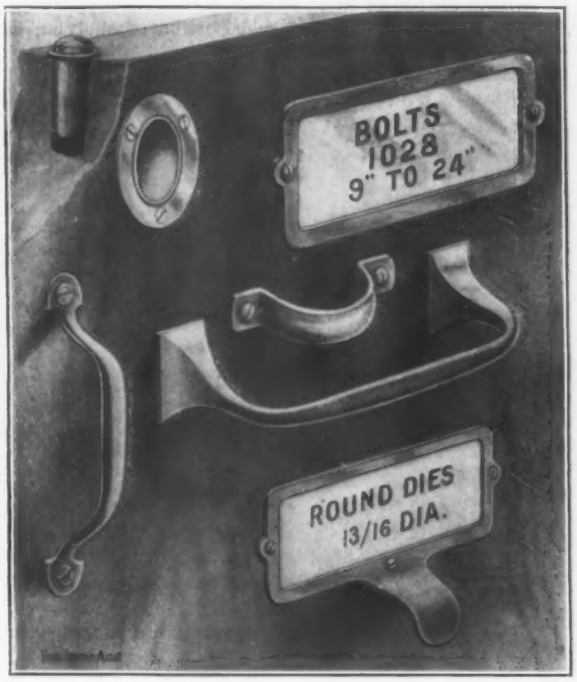



Fig. 7.—Card Frames, Pulls and Catch.

windows, a portion of which is shown in Fig. 8, is 7 feet high, while that of sections Cabinet Hardware and Tool, Fig. 2, is 5½ feet high. The shelving along the north and

Fig. 8.—Entrance to Show Windows.

south sides of the room extends to the ceiling (Figs. 3 and 4), but the shelf drawers extend only 7 feet above the ledges. Surplus stock is kept in original packages above the drawers; also under the counters in close proximity to drawers containing the goods.

Showcases, some of which are shown in Fig. 4, are of oak, and the wood work underneath them stands on bases of Tennessee marble. The cases have sliding sash

doors at the back, filled with clear plate glass instead of mirrors or wood panels. A dark maroon colored felt has been adopted for use in connection with sample boards and on the bottom of showcases, whether covered by sample boards or not.

In planning the fixtures each section of shelving and

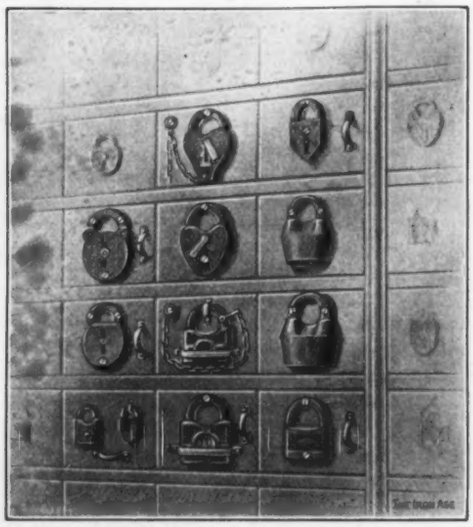


Fig. 9.—Samples of Padlocks.

each shelf drawer was arranged to accommodate certain goods, the drawers having partitions or not, as experience dictated, according to requirements both as to the size of the articles and the frequency with which they were called for. The articles in greatest demand were given more space than less active sellers in the same line.

The arrangement of the drawers after they were made was determined by cutting manila paper of the same dimensions as the bottom of the interior of each drawer. The kind of goods which was to be kept in any one drawer was laid on the paper and lines were drawn indicating where partitions should go. The kind and size or number of the articles were marked on the

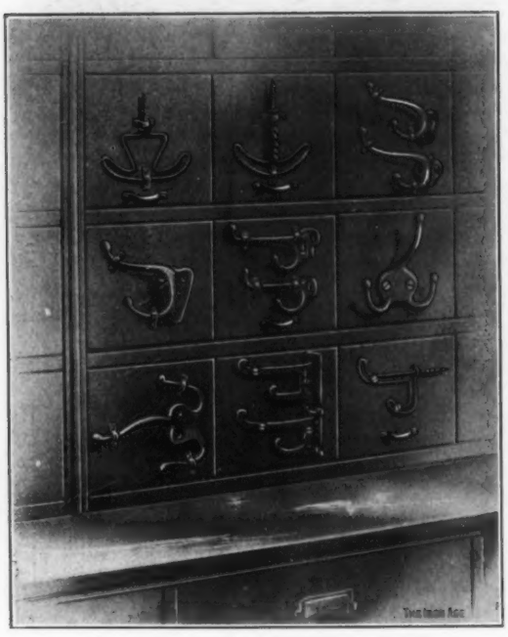


Fig. 10.—Samples of Coat and Hat Hooks.

paper as they were to be placed in the drawer. The diagrams were placed in the drawer bottoms, and the cabinet maker was told to cover the lines with partitions. Some of the goods required partitions the full hight of the drawer, others lower partitions, and still others partitions of uneven hights in the same drawer. On the bottom of each drawer was marked its location in the shelving. Provision was made for expansion or additions to stock by scattering a few empty boxes throughout the shelving. After the partitions were in place cardboard labels were marked with rubber stamp letters and figures, put in card frames on such drawers as were not to have samples on them, and covered with celluloid to prevent them becoming soiled. The size or number of the goods to go in the different compartments was marked with pencil on the top of the partitions, the paper diagrams in the bottom of the drawers furnishing the necessary information. The diagrams were easily torn from the drawers before the goods were put in place. In the arrangement for accommodating the goods nothing was left to chance. Even the bins on the upper stock floors were marked with the names of the goods for which they were intended.

The thorough prearranged plans for the location of goods permitted the closing of the Bowery establishment on a Saturday night and the opening of the new store ready for business the following Monday morning. Moving the stock was expedited by each employee being made responsible for putting in their proper places a certain proportion of the 70,000 items which make up the stock.

The Hardware stock on the north side of the room is

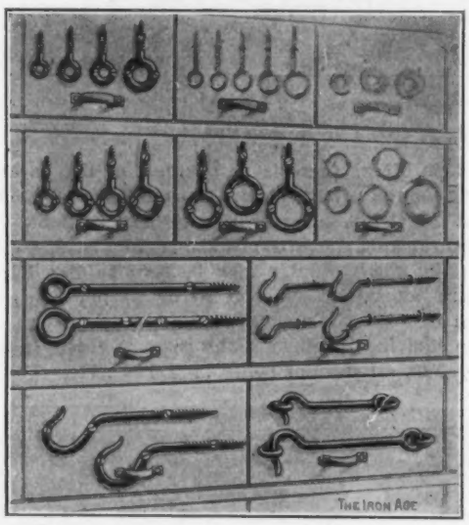



Fig. 11.—Samples of Bright Wire Goods.

arranged with the smaller goods to the left, leading up to the heavier goods on the right, with those most called for nearest the bottom of the shelving.

The arrangement of the stock throughout the entire building is such that the articles which any one class of customers would be likely to call for are grouped near together. This feature of arrangement is the outcome of years of experience. On the right hand of each shelf drawer in the retail department, as salesmen face it, an oblong shaped label of white paper is pasted, as shown in Fig. 6, stamped with the number or size of the article it contains, the floor on which duplicate stock is kept, also other information enabling salesmen to make sales intelligently. The label shown in Fig. 6 states that this number of Cabinet Lock with gilt keys, 12 changes to the dozen, is kept in stock; that iron keyed Locks are without changes; also that the overstock is kept on the fourth floor. All a new clerk has to know is the name of the goods and their location on the shelves, other information being given on the sides of the drawers.

The bearing surfaces of all drawers are coated on the upper edge of back and sides, also on the bottom, with a paraffine preparation, so that even a heavily filled drawer slides in and out very easily. In the preparation of the paraffine for this purpose it is heated and then thinned with turpentine so as to be applied with a brush.

The card frames and pulls illustrated in Fig. 7 were designed by the company and made to order. The large pull used on the drawers under the ledges was designed, for instance, to make it difficult to obtain a foothold, to present a small upper surface on which dust would not collect, to provide a lug to set into the wood and a shoul-

der on the surface, and to be fastened with machine screws from the inside of the drawer. With this pull the card frame near the top of the illustration is used. The combined frame and pull are used on the drawers above the ledges which have no samples on them. The smallest pull is used on sample drawers above the ledges, while the pull to the left is used on sliding sample boards. The Forg catch at the upper left hand side of the illustration is supplemented by a flush ring to pull out and is used on cupboard doors and drop fronts. All these trimmings have old brass finish on solid brass, so that if the finish should wear off the exposed surface would still be brass.

### The Show Windows.

The show windows, one on each side of the entrance, are of generous proportions, being 25 feet long, 4 feet deep and 6 feet high. They are inclosed at the back and top with handsomely grained mahogany paneled wood work, thus rendering them dust proof. An iron column passes through each window about an equal distance from the ends and sides. These are covered with mahogany, conforming in front to the curved lines of the columns. The parquet floor of the windows is made up of ma-

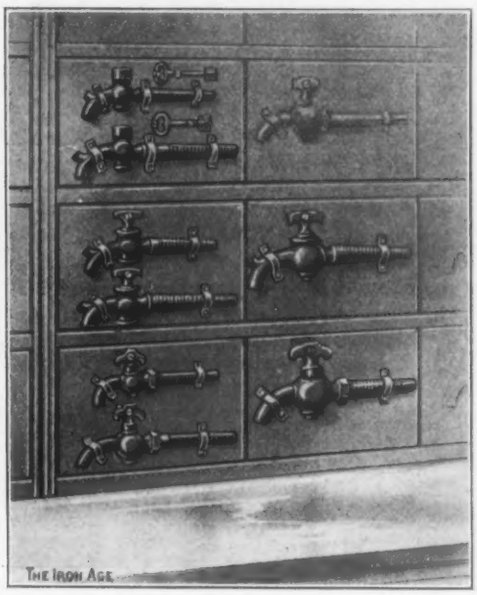



Fig. 12.—Samples of Brass Cocks.

hogany, each piece about six inches square, having the grain of the wood in alternate different directions.

The windows are lighted by electric lamps, with reflectors above the top of the glass. The lights are regulated by switches at the side of the door in Fig. 8. There are four of these doors, one at each end of the show windows, which are kept locked. The door frames are filled with plate glass, frosted nearly to the edges of the frames. The inclosed columns leave little space at the front, thus dividing each window into about equal parts. This permits the display of different goods of kindred lines in each window, as, for instance, mechanics' and machinists' tools, or tools and cutlery, in one window, and in the other fine builders' and cabinet hardware.

Goods are laid on the parquet floor of the windows, or this is covered with material of color best suited to show off samples of some classes of goods. Pyramids, shelves or other display fixtures are not used in the windows.

### Salesmen and Customers.

Salesmen are assigned to the different departments, and do not sell goods outside of their departments. There is a head salesman in each of the Hardware, Cabinet and Tool departments. A floor walker, who does not go behind the counters, directs customers to the departments where their wants can be supplied and sees that they receive prompt attention. No goods are allowed to be sold for less than the marked price. Should a customer be short a cent or two of the marked price the sale is lost rather than violate this rule. No one personally unknown to the passenger elevator man or unvouched for by some one in the store is permitted on the elevator.

### Sampling Goods.

In Fig. 3 is shown the Hardware shelving, along the north side of the room and immediately back of the north show window, a portion of the latter being

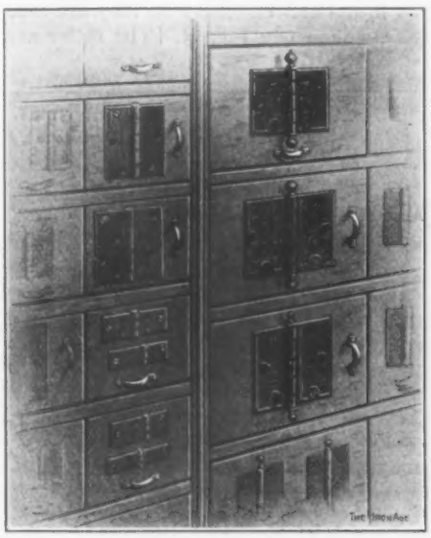


Fig. 13.—Irregularity in Attaching Pulls to Drawers.

shown in Fig. 8. In front of the dumbwaiter (Fig. 3) is the Cabinet Hardware section, which is included in the Hardware department. A partial view of the Hardware department is also given in Fig. 4, the Cabinet Hardware section, being to the left of the aisle. Goods are sampled on the drawers in the Hardware and Cabinet Hardware shelving above the ledges, while below the ledges and under the counters labeled card frames with names of the goods in the drawers take the place of samples. Goods are also sampled in show-

Fig. 14.—Artistic Effect in Sampling.

cases in all departments, but only on boards in the Cabinet Hardware section. It will be seen from the accompanying cuts that the sampling of goods receives a great deal of care and attention, particularly in the manner of securing them firmly to drawers and sample boards. It is the aim to have samples of all goods in the Hardware department displayed either on drawers or sample boards or in showcases. Samples are attached to drawers on the basis of a center line, without regard to whether the samples are on a straight line at either top or bottom.

In Figs. 9, 10, 11, 12, 13 and 14 the manner of sam-

pling a variety of goods is shown, from which can be obtained an idea of the general plan pursued. In Fig 9 Padlocks are fastened by screws through holes drilled in them, supplemented where desirable by brass strips fastened by screws. Coat and Hat Hooks (Fig. 10) are sampled in various positions, some with screws through the regular holes, some through holes drilled for this purpose, while others are held in place with brass strips. When Bright Wire Goods have sufficient surface, holes are drilled in the article, otherwise they are held in place by staples, as shown in Fig. 11. The latter are avoided

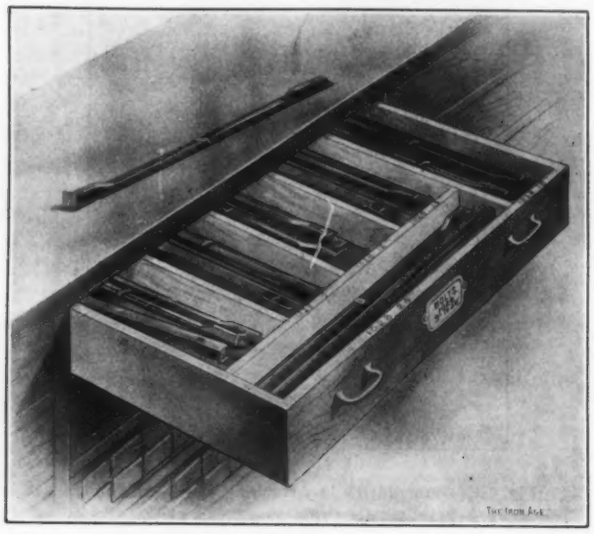


Fig. 15.—Drawers for Flush Bolts.

as much as possible in all sampling, as the samples eventually work loose. Brass Cocks (Fig. 12) are held in place by brass strips screwed to the drawer. In Fig. 13 Butts are shown fastened in the usual manner by screws. This cut also shows the drawer pulls attached in an irregular way, so as to best accommodate the samples and keep them in line.

An artistic effect is shown in Fig. 14 by arranging the chains of Chain Bolts in different designs. Door Knob samples appear on the drawers in the same position as they would on a door. The spindle is cut off so as to

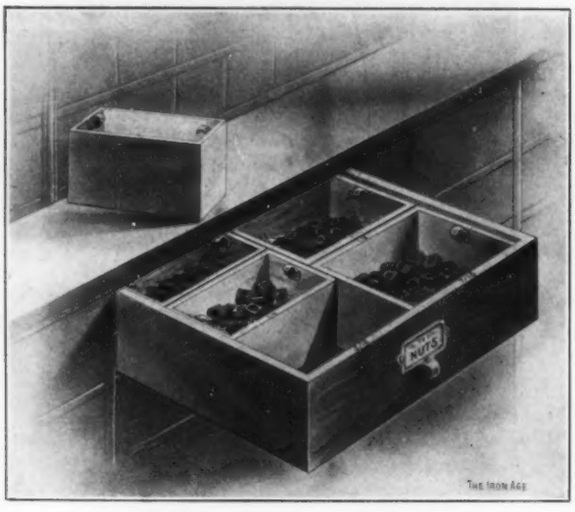


Fig. 16.—Boxes for Goods that Are Weighed.

permit it to project through the front of the drawer about ½ inch. A hole is drilled near the inner end of the spindle, through which a wire pin is run. Any looseness is avoided by putting washers between the wire pin and drawer front. Rim and some other Locks are sampled with screws through the keyhole and hub. Mortise, Dead Locks, &c., are sampled by taking off the cap, drilling holes in the back, through which screws are driven.

Before Padlocks and Cabinet Locks are put in the shelf drawers the keys are tied with twine to the Locks to which they belong, the twine being of sufficient length to permit trying the keys in the Locks by salesmen and customers. A standard length of twine is used for each of the two kinds of Locks, with the knots tied in a certain manner. Keys, strikes and screws belonging to each door Lock used as a sample are tied in a package and attached to the inside of the front of the drawer in which the goods are kept. The ends of the twine used in tying the package are left long enough to tie the fastenings to a staple on the inside of the drawer front.

The labor and time required to secure keys and trimmings to the Locks are more than repaid by not being obliged to hunt for them when making sales and by making the samples salable when the balance of the line is exhausted. Awning and Screw Pulleys are sampled with screws through drilled holes. Side Pulleys have screws through the regular holes. Eye Bolts have holes drilled in them and are fastened with screws.

The foregoing conveys a comprehensive idea how samples on drawers are treated, each article being secured to the drawers as shape, size and adaptability suggest. Samples on drawers and the sample boards not

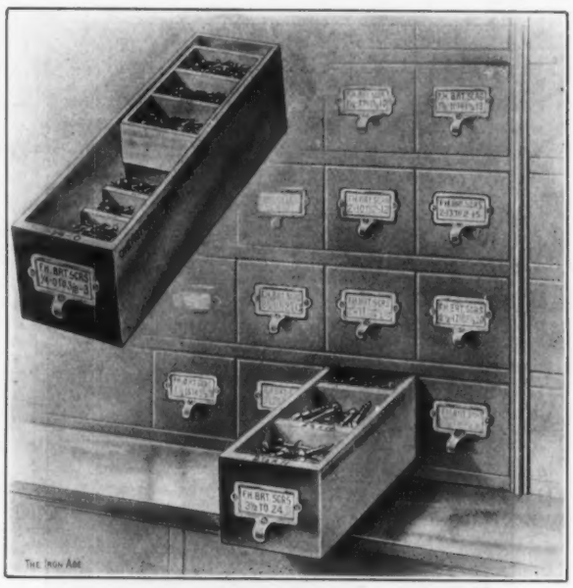


Fig. 17.—Arrangement for Keeping Wood Screws.

kept in showcases are covered with a coat of French varnish to preserve their fresh appearance.

### Drawers in the Hardware Department.

Representative examples of the interior arrangement of drawers in the Hardware department are shown in Figs. 15, 16 and 17. The number or size of the articles contained in any one drawer is marked on the top of the partitions. In some instances irregular compartments are required for the economical accommodation of the goods, as with Flush Bolts (Fig. 15). For goods which are sold by weight, such as Nuts, Washers, Staples, Panel Points, Rivets, Burrs, &c., boxes in drawers are provided, with sash lifts, as in Fig. 16, so that the goods can be poured into the scale scoop without handling. The lifts are fastened to the boxes with flat head brass machine screws.

Screws, &c., are kept loose in labeled drawers, as shown in Fig. 17. The drawer on the left of the cut shows an economical way of accommodating small Screws. There are six compartments in the bottom part of the drawer and three in the sliding tray on top. The latter slides forward and backward and always exposes three of the lower compartments.

Surplus stock in original packages is kept in numerical order in the open shelving above the drawers or under the counters in near proximity to the shelf drawers containing the same goods. This surplus stock is drawn upon when customers buy goods in large quantities or to put in the drawers when they need replenishing.

*(To be continued.)*

## REQUESTS FOR CATALOGUES, &c.

*The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.*

REQUESTS *for catalogues, price-lists, quotations, &c., have been received from the following houses and are referred to the manufacturers:*

FROM CHARLES E. RIGGS, Turin, N. Y., who has purchased the Hardware business for 20 years conducted by the late H. M. Riggs.

FROM CICERO OGLE, Collinsville, Ill., who has succeeded the Kirshbaum Hardware Company.

FROM MCINTOSH HARDWARE COMPANY, Kalispell, Mont., which has established a branch store at Whitefish.

FROM WELLS & MORRIS COMPANY, Cashmere, Wash., which has succeeded W. M. Olive in the general Hardware line.

FROM A. T. MILLER & SONS, Peru Ind., who have opened up in business as dealers in Shelf Hardware, Stoves, Implements, Paints, &c.

FROM OZONA HARDWARE COMPANY, Ozona, Texas, which has lately commenced operations in the sale of Hardware, Wind Mills, Pumps, Harness and Saddlery, furniture, &c.

FROM THOMAS & JONES, Lake Crystal, Minn., who have bought the Hardware, Stove, Implement, Paint and furniture business formerly conducted by Robinson & Barney.

FROM N. L. FOGLE, Meeker, O. T., successor to Meeker Hardware Company, of which Mr. Fogle was the founder.

FROM SUMMERS-PARROTT HARDWARE COMPANY, Johnson City, Tenn., which has been incorporated with a capital stock of $50,000 to carry on the wholesale business heretofore conducted by Summers, Barton & Parrott.

FROM CAROLINA HARDWARE COMPANY, Raleigh, N. C., incorporated with a capital of $75,000 to continue the wholesale and retail business formerly carried on by R. E. Prince.

FROM WM. A. BLOCKINGER, Martins Ferry, Ohio, who has opened a new store, carrying Shelf Hardware, Stoves, Implements, Paints, Sporting Goods, &c.

FROM DECKER & SILLIN, Buckland, Ohio, who have just embarked in business as dealers in Shelf and Heavy Hardware, Stoves, Implements and Paints.

FROM WESTERN HARDWARE & IMPLEMENT COMPANY, Mound Ridge, Kan., which has just put in a stock of Paints and Oils.

FROM C. A. HEDLAND, Holdrege, Neb., who has succeeded Dean & Hedland in the general Hardware business.

ALL the employees of the Robert Donahue Iron & Hardware Company, Burlington, Iowa, united with the members of the Donahue family the evening of December 30 in celebrating the anniversary of the fiftieth year in which Robert Donahue has been in business in that city. Mr. Donahue after the banquet, in which all participated, made an address in which he sketched his life and business career, he being now 74 years old. At the conclusion of his speech he was presented with a handsome gold headed cane on behalf of the employees and members of his family as a token of the honor and affection in which he is held.

## CALENDARS, ETC.

W. E. BARRETT COMPANY, Providence, R. I.: Pictorial hanger calendar.

THE J. D. SMITH FOUNDRY SUPPLY COMPANY, Cleveland, Ohio: Vest pocket diary and memorandum book for 1905.

GEORGIA SUPPLY COMPANY, Savannah, Ga.: Pictorial monthly hanger calendar.

ROCHESTER STAMPING COMPANY, Rochester, N. Y.: Postal circular purporting to be a check for 365 happy days.

MCKINNEY MFG. COMPANY, Allegheny, Pa.: Diary and memorandum book for 1905 of vest pocket size.

SABIN MACHINE COMPANY, Montpelier, Vt.: Pictorial hanger calendar with large monthly sheets.

HOPKINS & ALLEN ARMS COMPANY, Norwich, Conn.: Large pictorial monthly hanger calendar.

DIAMOND SAW & STAMPING WORKS, Buffalo, N. Y.: Pictorial monthly hanger calendar.

L. S. WINNE & CO., Kingston, N. Y.: Desk calendar with sheets for each week of the year.

SMITH BROTHERS HARDWARE COMPANY, Columbus, Ohio: Pictorial hanger calendar with monthly sheets.

THE WHITMAN & BARNES MFG. COMPANY, Chicago, Ill.: Hanger pictorial calendar, with large monthly sheets.

HENDRICKS BROS., 49 Cliff street, New York: Red leather covered diary and memorandum book, vest pocket size.

KIRCHER & SON, Belleville, Ill.: Weekly desk calendar for 1905.

THE WYOMING SHOVEL WORKS, Wyoming, Pa.: Weekly memorandum calendar in the form of a pad, which may be hung up.

WM. H. WOOD, Media, Pa.: Large monthly hanger calendar, with especially bold figures.

## AMONG THE HARDWARE TRADE.

E. L. Scott & Co., Hardware merchants, Oakesdale, Wash., have purchased the Farm Implement business of Benton & Manning at Thornton, Wash.

L. H. Reynolds, dealer in Hardware and Implements, Steinauer, Neb., has disposed of his business to R. N. Cox.

Emanuel Stephen has bought the Hardware stock formerly carried by Nuttle Brothers, Andrews, Ind.

Niles & Clark are successors to G. C. Moore in the Hardware, Stove, Paint and general merchandise business, Erieville, N. Y.

A. J. Baxter has disposed of his Hardware, Stove and Implement business at Neosho Falls, Kan., to O. H. Edwards.

The Hardware, Stove, Paint and plumbing establishment of C. A. Berglund at Moline, Ill., was damaged by fire a short time since. The loss was fully covered by insurance, which has been adjusted.

M. B. Castillo has bought the Hardware and Implement business heretofore carried on by H. S. Joy, Elmo, Mo.

Paige & Green, dealers in general Hardware, Netawaka, Kan., have been succeeded by Paige & Warning.

Hawley Brothers, Hardware, Stoves, Agricultural Implements, Paints, Sporting Goods, Harness, &c., Potter, Kan., have sold out to J. R. Parker.

# OPEN AIR HARDWARE STORES IN MEXICO.

FROM A SPECIAL CORRESPONDENT.

IT is natural that in countries where manufacturing industries have either not yet been established at all, or are only in an embryotic condition, that lines of retail business should grow up which are unknown in lands where manufacturers, jobbers, retailers and purchasers form, as it were, so many connecting links in the production, distribution and consumption of all classes of commodities. People who live in lands wherein every need in the way of metal articles can be supplied quickly and at low cost by a visit to the nearest Hardware store, where obliging salesmen will fill a customer's order for any required article from a Strap Hinge to a Blacksmith's Anvil, know little of the value set upon the odds and ends of Iron, Steel, Brass and Tin, and the hundreds of small manufactured things of household utility, in countries which have to import almost every Nail, Tool and metal article in use in the varied lines of industry.

### A Business of Odds and Ends.

This is the present condition of Mexico. As a consequence every bit of metal, whether it be a thread-worn old Screw, a superannuated, rusty Lock, a few links of Iron Chain, or other article among what may be termed the flotsam and jetsam of the Hardware trade, which in the United States would go into the ash barrel, or, at best, to the junk shop, has here a money value as an article of utility, and good as a trading asset. This trade in miscellaneous metal is well established, and it differs in many respects from what is known as the junk business in other countries. In the first place, the *fierrero*, or seller of old Iron, invariably, paradoxical as it may sound, "keeps store" without having one, for his varied wares are placed upon the ground in some public place, preferably the market, with the broad dome of heaven or a strip of canvas cloth for a cover. To summarize even in brief his stock in trade would make a demand upon the patience of the reader, as well as upon your restricted space. It may be said, however, that nothing made of metal, no matter how old or battered it may be, comes amiss to him.

### No Questions Asked.

He is ever ready to buy, at a tenth of their value, any articles of this class, without asking questions as to how the seller came into possession of them. If the object offered him is new, or only slightly worn, so much the better, for there is a greater prospect of obtaining a profit when the person comes along, sooner or later, as he or she undoubtedly will, who wants that identical article. Dishonest workmen, who pick up Tools in the establishments of their employers, are regular patrons of the *fierrero;* men servants of great houses, who "find" metal knick-knacks lying around loose, also add their contributions to his stock; in fact, anything of a portable character which comes within the category of Hardware, if mysteriously "lost" from house or factory, may generally be found if search be made in these *al fresco* Hardware "stores."

### A Profitable Branch.

One branch of business which brings profit to the *fierrero* is that of supplying Keys to open Locks of which the original Keys have been either lost or mislaid. To meet this daily demand he picks up Keys of all sorts and sizes wherever he can get them at a few cents apiece. These he strings upon a wire ring according to their sizes. When the Key of a box, wardrobe or other household receptacle is missing a servant is sent to the *fierrero* for a bunch of Keys, if the article to be fitted is too bulky to be sent to his open air depot, and generally, after many trials, a Key is found which fits the lock. The housekeeper is once more happy, and the *fierrero*, having made a clear profit of from 100 to 500 per cent., is also content.

In trading with these nimble gentry, however, one has to keep his wits about him, for although they do a legitimate business, and pay taxes, sales of the articles which they carry in stock are slow, and some of them are not averse to increasing their income by indulging in sharp practice. As an example of their tricks of trade it may be related that the author once had occasion to visit the establishment of a *fierrero* in search of a small Key to open the Padlock of a tin box used for receiving

*Mexican Open Air Hardware Stores.*

voluntary contributions to a public institution. After trying many Keys, one was found which opened the lock. The well filled wire ring was handed to the Hardwareman with a request that he detach the Key indicated as fitting the Padlock. Assuming the risk that his customer might or might not again try the Key in his presence, the wily Hardwareman took another Key off the ring and handed it to the writer, who half an hour later discovered that another visit and another purchase were necessary. It is perhaps needless to say that the writer profited by his experience, which was cheap, as it cost him only 6 cents.

**"Arrangement" of the 'Store."**

The method of business of the *fierrero* is to spread his stock either upon the cobble stone floor of the market court yard or upon sacks upon the ground,, and to sit down beside it in the sun, waiting for a customer. He is a very patient individual, who seems to possess a constitutional aversion to the use of energetic or novel means to attract custom. He entertains the fixed belief that if he has in his stock any article which a person may need, that person will find him in due season, and the sale will then be made; therefore, as the sun is shining, why should he worry?

Sometimes one sees strange articles among the *omnium gatherum* spread out to catch the eyes of possible customers. Here, for example, are old Files, Screws, the head of an Axe, the handle bar of a Bicycle, a post office Letter Box, a Lamp Post, a wire Bird Cage, a Hammer; and there some miner's Steel Drills, a Saw, a Ratchet and Bits. All is fish which comes to the *fierrero's* net, and every sale will mean a profit when the sale is made. There is always a *mañana* (to-morrow). In the meantime the Hardwareman sits in the sun, gossips with his neighbor and enjoys a *dolce far niente* existence, without qualm of conscience.

Perhaps, after all, his system is based upon a sane philosophy, for he knows that men, like Old Iron, may reasonably look for a longer lease of life if precaution be taken against the ravaging effects of undue friction of the working parts.

## NORVELL-SHAPLEIGH HARDWARE COMPANY.

SOME idea of the growth of the business of the Norvell-Shapleigh Hardware Company, St. Louis, Mo., under its present management may be obtained from the following statement of percentages of increase in the company's sales of leading goods in 1904 as compared with 1901:

*Percentages of Increase in Sales for 1904 over 1901.*

| | |
|---|---|
| Builders' and Shelf Hardware | 353% |
| Shovels, Spades and Scoops | 354% |
| Forks, Hoes and Rakes | 397% |
| Rubber and Cotton Hose | 412% |
| Carpenters' and Machinists' Tools | 426% |
| Enameled, Galvanized and Tin Ware | 452% |
| Cutlery | 535% |
| Lawn Mowers | 703% |
| Stove Pipe, Stove Boards, &c. | 754% |
| Ice Cream Freezers | 808% |
| Guns and Sporting Goods | 833% |
| Poultry Netting and Wire Cloth | 1213% |
| Screens and Door Screens | 1270% |
| Boys' Iron Wagons | 1350% |
| Harness, Saddlery, Hardware, Whips | 1535% |
| Paints and Brushes | 1760% |
| Sewing Machines | 2200% |
| Manila and Sisal Rope | 5888% |

The new stocks sold by the company in 1902 were 96 in number, and in 1903, 121, while in 1904 they were 240. The company has adopted as a motto "The Jobber's First Duty Is to Protect His Customer." It also emphasizes the fact that it does not sell to catalogue houses, to premium houses or to consumers. With a view to aiding merchants in an enterprising and aggressive extension of their business the company has prepared a pamphlet entitled "Twenty-five Ways to Increase Your Business," which will be sent to Hardware merchants upon request. It undoubtedly contains valuable suggestions which should be helpful to enterprising merchants.

## PRICE-LISTS, CIRCULARS, &c.

*Manufacturers in Hardware and related lines are requested to send us duplicate copies of catalogues, price-lists, &c., one copy for our Catalogue Department in New York and another for our London office; and at the same time to call our attention to any new goods or additions to their lines, of which appropriate mention will be made besides the brief reference to the catalogue or price-list in this column.*

LANE BROTHERS COMPANY, Poughkeepsie, N. Y.: Illustrated catalogue and price-list showing Door Hangers, Fire Door Fixtures, Store Ladders, Tackle Blocks, Carriage Jack, Measuring Faucet, Coffee Mills, Drug Mills, Root Cutter, &c.

SHORT MFG. COMPANY, North East, Pa.; New York office, 826 Broadway: Catalogue No. 1-C, devoted to Chairs, Rustic and Mission Furniture, Swing Chairs, Children's Cradles, Toys, Novelties, &c.

SPRING STEEL FENCE & WIRE COMPANY, Anderson, Ind.: Illustrated catalogue describing various styles of Shimer Fence made from high grade carbon wire.

AMERICAN AIR TOOL COMPANY, Dunkirk, N. Y.: Illustrated catalogue and price-list devoted to fine Carriage, Coach and Wagon Axles.

THE R. B. NOVELTY WORKS, 867 Conway street, St. Paul, Minn.: Catalogue illustrating novelties in Kitchen Utensils, Toys, Games, Puzzles, Advertising Specialties, &c.

THE VEEDER MFG. COMPANY, Hartford, Conn.: Booklet No. 58, devoted to illustrations of the Veeder Form D Odometer for automobiles, with flexible shaft connection.

THE A. & W. ELECTRIC SIGN COMPANY, Cleveland, Ohio: Catalogue devoted to Talking Signs, by which 40 words or phrases are automatically repeated until the current is turned off, without intermission of darkness, quickly or slowly, as required.

WILCOX MFG. COMPANY, Aurora, Ill.: Booklet entitled "Pull—Don't Push," describing its Giant Wire Stretcher, with illustrations showing the Stretcher at work.

A. SANFORD LOGGING TOOL COMPANY, Oshkosh, Wis.: Catalogue H, 1905-1906, illustrating its complete line of Lumbering Tools, Ice Tools, Lumber Carts and other specialties. The catalogue will be sent to lumbermen, Hardware or mill supply houses in the United States, Canada and Mexico upon request.

EMPIRE CHAIN COMPANY, Pittsburgh, Pa.: Chains. An illustrated catalogue shows Straight Link and Twist Coil Chain, Cable, Conveyor, Car Brake, Railroad, Switch, Rafting, River and Log Chains; Hooks, Mine Car Hitchings, Shackles, Rings, Chain and Ring Dogs, &c. In addition the company makes to order any special pattern Chains not included in the catalogue.

FARWELL, OZMUN, KIRK & Co., St. Paul, Minn.: Catalogue for 1905, devoted to an extensive line of Loaded Shells.

THE STANLEY RULE & LEVEL COMPANY, New Britain, Conn., and 107 Chambers street, New York: Advance sheet showing many new goods that will appear in the company's catalogue No. 31, to be issued some time during the current month. Among the new goods are various kinds of Planes, with both iron and wood bottoms; Razor Edge Spoke Sheaves, with wood and iron handles; a large variety of round shank Screw Drivers, many new Braces, both plain and ratchet; Bit Gauge, Angle Divider, Chute Board, Zigzag Rules and other goods of kindred character.

THE CENTRAL STAMPING COMPANY, 24 Cliff street, New York: Illustrated descriptive catalogue No. 13 of Sterling-Aluminum Enameled Ware, containing 48 pages of general lines of Kitchen, Cooking and Household Utensils. Also general catalogue No. 12, 231 pages, of its entire line, including Enameled Ware, Tin, Galvanized and Sheet Metal Goods.

BUTLER BROTHERS, New York: January, 1905, catalogue, No. 524, containing 320 pages, devoted to a vast variety of goods sold to dealers only.

BLACK SATIN POLISH COMPANY, Wakefield, N. Y.: Circular relating to Black Satin Stove Polish.

THE PHELPS & BIGELOW WIND MILL COMPANY, Kalamazoo, Mich.: Illustrated price-list of Steel and Wood

Wind Mills, Towers, and Tanks, Feed Cookers, Pumps, Pipe, &c.

HAYES PUMP & PLANTER COMPANY, Galva, Ill.: Catalogue devoted to Corn Planters and Drills, Cotton Planters, Riding and Walking Listers, Riding and Walking Cultivators, Harrows, Shoveling Boards, Pumps, Wood Tanks, &c.

REED MFG. COMPANY, Erie, Pa.: Folder devoted to Q. & E. Pipe Dies and Malleable Iron Stocks. The throats are all ground after the die is hardened to give a die with chasers absolutely true as regards a common center and to insure proper clearness and sharpness.

MAINE MFG. COMPANY, Nashua, N. H.: White Mountain Refrigerator catalogue for 1905, illustrating the lines of the White Mountain Grand, Stone White, Opal Glass Lined and Stone Lined Refrigerators; hardwood, pine, grocers' and butchers' Refrigerators, Ice Chests, Window Screen Frames, &c.

## MISCELLANEOUS NOTES.

### The Reece Improved Screw Plates.

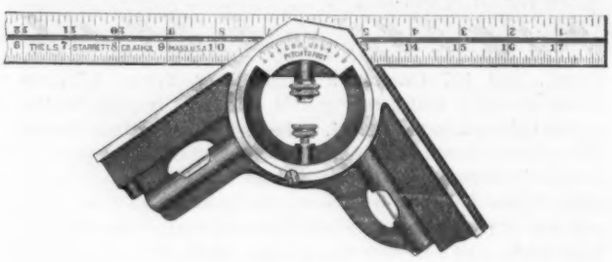
The E. F. Reece Company, Greenfield, Mass., has improved its screw plate by knurling the handles of the stocks to prevent slipping when oily, the knurling giving a firm hold for the hands. The patent adjustable guide which centers the iron or steel to be threaded with the utmost accuracy is referred to as a distinctive feature of the plates. The guide insures the cutting of true threads, and also does away with the necessity of having collets for holding the dies. An 84-page illustrated catalogue describing the company's complete line of screw plates, taps and dies will be sent on request.

### Sterling-Aluminum Enameled Ware.

The Central Stamping Company, 24 Cliff street, New York, has just put on the market a complete line of gray extra coated Sterling-Aluminum enameled ware for the numerous purposes for which such goods are made. The company alludes to it as made from the best American sheet metal and coated with pure ingredients, guaranteed free from any poisonous substance whatever. The metal is prepared and enameled under an entirely new process controlled by the company. The aluminum process both fills the pores of the basic metal and causes the enamel to adhere firmly. This ware supersedes its Primo enameled ware.

### Protractor No. 16.

The L. S. Starrett Company, Athol, Mass., is placing on the market the protractor shown herewith. The blade closes in the stock either way against a stop, making a



*Protractor No. 16.*

perfect square, plumb and level. A 12, 18 or 24 inch blade may be used in connection with the stock, and with a 24-inch blade it weighs 1¾ pounds. The turret is graduated on both sides, one in degrees, the other to show pitch to the foot, so that the blade may be set by the graduation for laying off angles to any degree or any pitch, and the opposite branch of the stock will be right to lay out the complementary angle without mental calculation or error for valley roofs, bridge work, stair gauges, &c. The levels are so arranged that work can be leveled up to any degree or pitch underneath or on top of a roof, rafter, stair stringer, &c. As a square or protractor with the sliding blade it can be used in places where a fixed blade cannot, and is a substitute for a whole kit of squares, it is explained, from the shortest to the full length of blade, making a depth gauge for squaring in mortises and transferring measurements. It may be used in place of the carpenter's old time square, with the advantage of being packed in a chest without taking up so much room. Without the blade the stock may be used in contracted places as a 6-inch level and plumb, while with an 18 or 24 inch blade a level and plumb of corresponding length is obtained. It is remarked that, taken altogether, the tool makes a kit that will be appreciated by the progressive mechanic. The stock is sold with or without the blade.

### Match, Jack and Furring Planes.

The Stanley Rule & Level Company, New Britain, Conn., and 107 Chambers street, New York, has put on the market several lines of new planes, of which those here illustrated are a part. Fig. 1 is a double end match

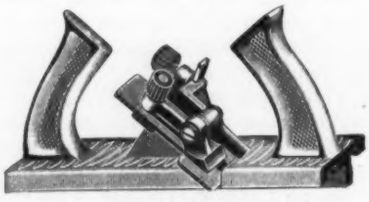


*Fig. 1.—Double End Match Plane.*

plane, with both tongue and groove irons. With one side a tongue can be cut, and by reversing ends the plane will cut a groove to fit. The tonguing tools are made wider on one side for use on thicker stuff than the plane will tongue and groove in the center. They are nickel plated and made in three numbers, for ⅜, ⅝ and ⅞ inch boards, cutting respectively grooves of ⅛, 3-16 and ¼ inch, and

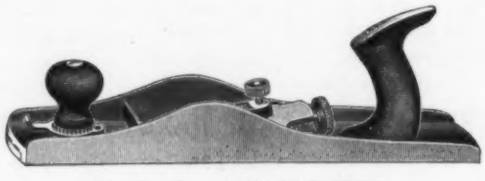


*Fig. 2.—Low Angle Jack Plane.*

all at the same list price. Fig. 2 is the Stanley low angle jack plane, which is especially adapted for cutting across grain on heavy work, where more is required than can be obtained by using the ordinary block plane. The plane is fitted with patent adjustable throat, which enables the user to work equally well on hard or soft wood. The bed

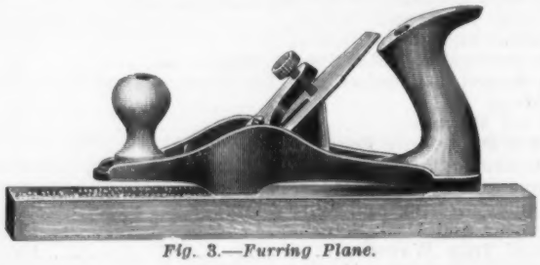


*Fig. 3.—Furring Plane.*

is 14 inches long and carries a 2-inch cutter. Fig. 3 represents a furring plane, which it offers as a new tool for preparing lumber as it comes roughly sawed from the mill, to remove the fur and grit before using a smooth plane. The construction of the bottom is such as to accomplish the purpose very rapidly. The bottom is 10 inches in length and has a 2-inch cutter.

LAST WEEK the Bindley Hardware Company, Pittsburgh, gave a banquet in that city to its salesmen. E. L. Lloyd, secretary of the concern, acted as toastmaster, and short addresses were made by John Bindley, W. H. Cochrane, John Reitz, W. J. Mercer and a number of Western representatives of the concern.

## Flinker s Razor Guard.

Graham & Berwin, 7 Warren street, New York, manufacturers of hardware specialties, brass goods, &c., have recently put on the market Flinker's adjustable razor guard, here illustrated actual size. Fig. 1 shows the

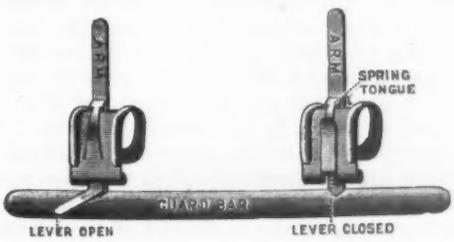



*Fig. 1.—Flinker's Universal Adjustable Razor Guard.*

guard as applied to any razor blade, from those ⅜ inch wide to the largest. As seen in Fig. 2, the side of guard bar next razor blade has raised portions, which permits of lather, &c., passing through freely. In applying guard to razor the lever of each clamp is thrown over, as illustrated at left of Fig. 1, and after adjusting properly to width of blade the levers are closed, thus holding guard

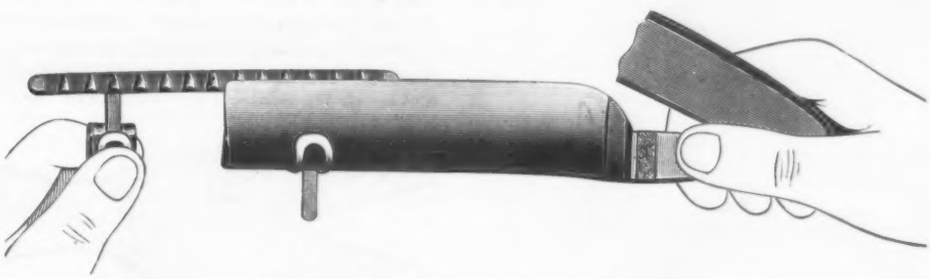


*Fig. 2.—Method of Applying to Razor Blade.*

firmly to razor, it being an easy matter to slightly pry apart or pinch them together if blade happens to be either thicker or thinner than normal. One adjustment is all that is required for any one blade, the guard being instantly removed or replaced for honing. &c. This guard is both strong and light and is nickel plated.

## Stanley Razor Edge Spoke Shaves.

The Stanley Rule & Level Company, New Britain, Conn., and 107 Chambers street, New York, has just

*Fig. 1.—Adjustable Spoke Shave Cutter.*

brought out the Stanley Razor Edge spoke shaves, here illustrated. Figs. 2 and 3 represent handles of both iron

*Fig. 2.—Iron Handle Razor Edge Spoke Shave.*

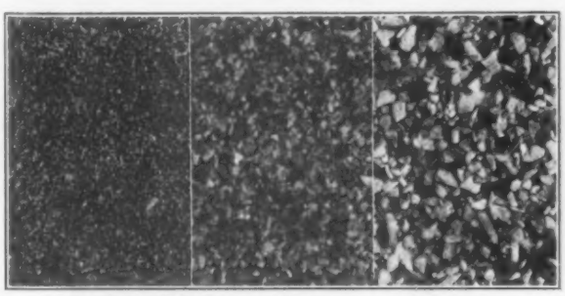
and wood, in the order given, Fig. 1 being a view of the reverse side, showing cutter, which is hollow ground to

*Fig. 3.—Same Tool with Wood Handles.*

give a keen cutting edge. The adjustable front can be moved up or down, opening or closing the mouth, and with the cutter properly adjusted a coarse or very fine shaving can be cut. There are eight numbers in all, two with japanned iron handles, 11 inches long, with 2 and 2½ inch cutters; two with nickeled handles and some otherwise. Those with wood handles are 11 and 12 inches long, with 2 and 2½ inch cutters, in rosewood, and the same styles and sizes can be had with boxwood handles.

## Trinidad Asphalt Ready Roofings.

The Stowell Mfg. Company, 459 West Side avenue, Jersey City, N. J., has just put on the market a group of new covered ready roofings, as here shown in the three-part cut. The portion at the left illustrates the Rexoid brand. This is made in half ply for light work and in 1, 2 and 3 ply, according to the service required. The best fibrous wool felt is used, which is saturated at the works with genuine Trinidad asphalt from the Pitch Lake on the island of that name. Emphasis is laid by the manufacturer on the fact that no coal tar products whatever are used, but Trinidad asphalt only, from which the ages have evaporated the more volatile oils, leaving a bituminous residuum that remains elastic and tough instead of becoming hard, brittle and liable to crack after exposure to the elements. In the Rexoid roofing the surface is covered with a top coating of ground mica, which renders it fire proof against flying embers, and is not affected by hail, heat, cold, acid, gases, &c., and, the maker says, structures so covered can be insured at the same rates as charged where metal or gravel roofs are used. The rolls contain 216 square feet, and prices include cement and large head nails for laps. The middle section of the cut illustrates ready roofing with Felspar covering and is somewhat coarser than the ground mica, the covering being a species of finely crushed rock. This roofing con-



*Trinidad Asphalt Ready Roofings.*

sists of two thicknesses of felt treated with asphalt, as described above, cemented together and covered on top with the same material, to which the Felspar is added. The division at the right of the cut represents a slag ready roofing, which is made with two thicknesses of felt in the same manner as the Felspar brand, the difference being in the top covering of slag, coarser than the Felspar. These roofings can also be furnished in rolls of 108 square feet and all are 32 inches wide. The capacity of this factory has been increased to a possible 2000 squares of 108 square feet per day of 24 hours, working extra shifts. The company has long made ready roofings covered variously with gravel, cork and asbestos, and also produces single, double and triple ply Trinidad asphalt saturated roofing felts. Samples of both the new roofings and the older styles have been prepared for quick mailing to any who are interested.

## American Expansion Fastener.

One of the problems that have confronted the builders of all glass store fronts and showcases has been a fastener that will take care of undue strains upon the

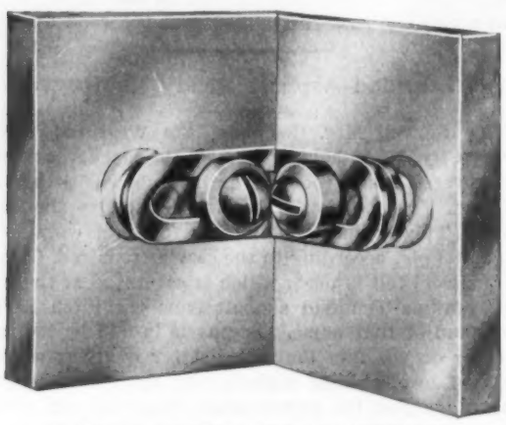


*Fig. 1.—American Expansion Fastener.*

glass caused by settling or warping of wall or floor and by wind pressure and vibration such as comes from the passing of heavy electric cars. The nature of glass is such that to give it a twisting strain oftentimes is to

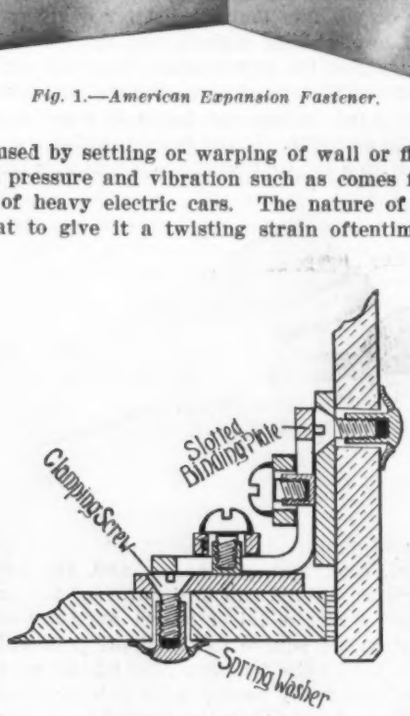



*Fig. 2.—Cross Section View of Expansion Fastener.*

crack and break it. It may readily be seen that when two plates of glass are placed together at an angle, the vertical edge of the one against the face of the other, something must give if one plate is subjected to a down-

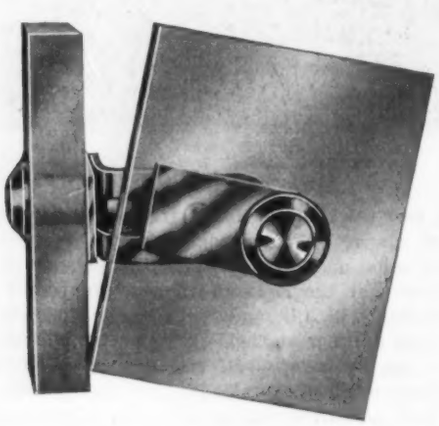


*Fig. 3.—Side View of Expansion Fastener.*

ward pressure, either straight or oblique, while the other remains stationary. The American expansion fastener here shown is designed to permit of these almost inevitable results of slight changes in alignment of buildings, in walls and floors. The clamping screws, which engage sockets bearing upon countersunk metallic spring washers, are rigidly attached to the glass without liability of breakage, as the give of the spring washers distributes the pressure equally. By this provision sidewise movement of the socket becomes impossible excepting under great pressure, which precludes liability of damage to the glass under ordinary conditions. When extraordinary conditions arise, such as the settling which frequently takes place in a new building, and causes exceptional strain on either or both of the joined glass plates, the strain is taken by the slotted binding plate, or angle iron, the sockets of which, at the back of the device, which are less securely held in attachment with the slotted binding plate than are the front sockets to the glass plates, are more quickly affected by the strain, and acting in response to it move automatically in the slot of the binding plate, either horizontally or with rotary motion. The fastener is manufactured by the American Glass Clamp Company, Worcester, Mass.

## Rethreading Die Attachment for Wrench.

Star Mfg. Company, Carpentersville, Ill., is introducing a rethreading die attachment for use in connection with its 7-inch adjustable wrench, both of which are shown in the accompanying cuts. There is a variety of interchangeable dies for recutting threads on bolts without removing a damaged bolt from a corner or angle where it belongs to a vise so that a double handled die stock can be used. The attachment is a ratcheting de-

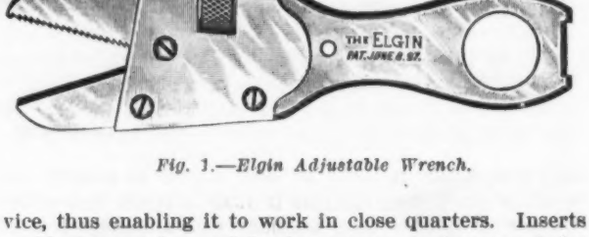



*Fig. 1.—Elgin Adjustable Wrench.*

vice, thus enabling it to work in close quarters. Inserts or blanks can be used having square or hexagon holes suitable for taps, set screws, machine screws, &c., thus making a ratchet wrench when required. The attach-

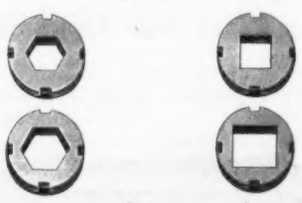


*Fig. 2.—Inserts or Blanks.*

ment is referred to as not being in the way while working the wrench, but as making a firmer hand hold and as filling the hand better. The attachment is sold with one die, of a size the customer chooses within its range. At present only dies of standard bolt thread will be carried, in the following sizes: ¼, 5-16, ⅜, 7-16 and ½ inch. Extra dies of the different sizes are interchangeable and

*Fig. 3.—Rethreading Die Attachment and Dies.*

can be had at any time. The attachment is fully nickeled and in harmony with the wrench. The new model wrench, pattern of 1905, is adapted to fit the attachment, and customers having this model can, it is remarked, buy and apply the attachment at any time later and be assured that it will fit.

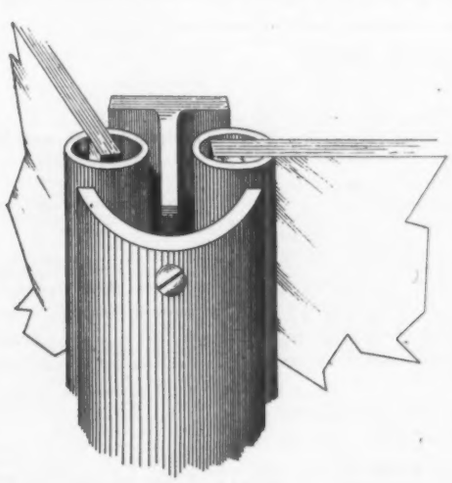
## Automatic Drill No. 108.

The Goodell-Pratt Company of Greenfield, Mass., has just brought out the automatic drill shown herewith. It is referred to as embodying all the good points in its other styles, and as having in addition many new and valuable improvements. The handle grip is knurled the entire length, the rotating cap through which the drill points are extracted is smooth and solid and so shaped as to avoid injuring the hand of the operator even in continuous use. The cap is held locked in place by a spring bolt, and can be unlocked and rotated by moving the catch. The exact location of each drill point is shown at a glance, each being contained in a separate numbered compartment. After removing the drill point the cap is turned until locked, and no amount of use can unlock it. This can only be done by moving the catch at the side. The end nut by which the jaws are tightened is large, knurled the entire length, insuring a good grip, and a simple mechanism is so arranged that this nut cannot be turned off. It can only be removed by pulling sufficiently hard to release the spring within, although for actual use it is tightened and loosened in the same manner as an ordinary nut. The shanks of the drill points are so milled that when properly fastened in the chuck they cannot be pulled out when in use; eight drill points varying in size from 1-16 to 11-64 inch are furnished with each tool. The drill itself is 9½ inches long, is full polished and nickel plated.

*Automatic Drill No. 108.*

## Universal Sash Bar.

We illustrate herewith the Universal sash bar of which G. M. Voltz, St. Joseph, Mo., is the patentee and manufacturer. The bar is made of heavy brass with iron T-bar. The bar works straight or as a transom bar and at any or all angles, and provision is made for settling of the building and expansion of glass. The maker states that the bar occupies but 2 inches of space and yet is sufficiently strong to withstand wind pressure, requiring no braces or stay bolts or frame work. It is declared to be water and dust proof and comes fitted, the only tool necessary for its application being a screw driver. The bar is also made for curved or oval fronts.



*Universal Sash Bar.*

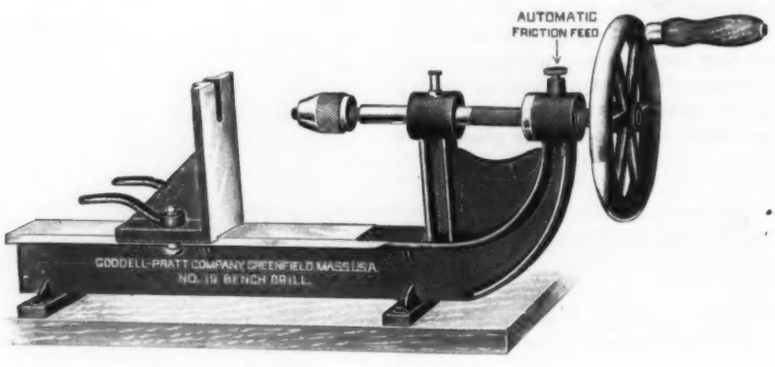
## The Veeder Form D Odometer.

The Veeder Mfg. Company, Hartford, Conn., is putting on the market the odometer for automobiles illustrated in the accompanying cuts, the register in the center being shown full size. The odometer has two registers, the upper one being a trip register, which may be set at zero at will, while the lower one keeps a record of the total number of miles traveled in different trips. Both registers indicate in tenths, the right hand figure on each being in red. The figures themselves are of a readable size, compactly arranged, all the gearing of the odometer proper being contained inside the number rings. The device is operated by gears and flexible shaft, the latter being protected by a metallic, flexible sheathing. By the use of small drive gears and large pinions a high speed of revolution for the shaft is avoided, to give smooth, even, comparatively slow operation, thus insuring durability and a small amount of wear. Two styles of the Form D odometer are supplied; the straight drive, shown at the upper right hand portion of the illustration, and the bevel drive, which is shown at the upper left hand corner and in the center. The straight drive is known as Form D 1 and the bevel drive as Form D 2. In the first the flexible shaft is introduced horizontally directly into the side of the odometer; in the second the shaft may be brought up straight from the floor of the car or through the dash directly back of the instrument, bevel gears conveying the movement of the odometer. One style or the other is supplied according to the car for which it is ordered. All parts of the complete odometer are regularly finished in polished nickel, and special attaching fixtures are provided.

*The Veeder Form D Odometer.*

## Horizontal Bench Drill No. 19.

The bed of the horizontal bench drill shown in the accompanying illustration is milled, as is also the tail stock, consequently to throw a better stream. The change from a straight stream to a spray and from spray to shut off is readily made by revolving the body portion of the nozzle. There are no sand holes or flaws in the nozzle, the manufacturer states, thus doing away, it is remarked, with nozzles being returned by purchasers to dealers. Every nozzle is tested to 100 pounds water pressure before being shipped from the factory. The nozzle is offered by H. B. Sherman Mfg. Company, Battle Creek, Mich.

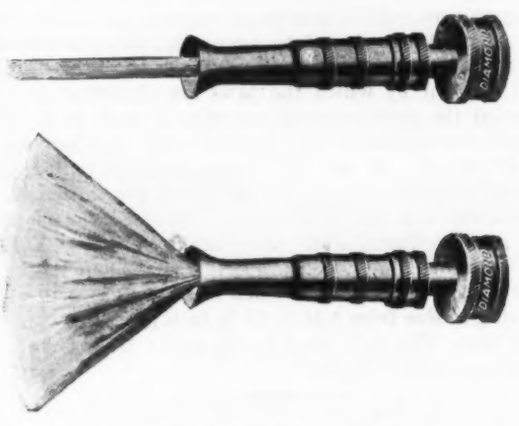



*Horizontal Bench Drill No. 19.*

both on the bearing surface and on its face. The clamping nuts are provided with handles for convenience, and the edge of the hand wheel is turned and polished. The drill has an automatic closing oil cup, steel feed screw and spindle, and is provided with an automatic friction feed, which is regulated by turning the thumb screw shown in the cut. The machine is fitted with a three-jawed chuck, having a capacity from 0 to ⅜ inch. The body of the drill is finished in enamel, while the machine parts are polished bright. The manufacturer states that there is nothing cheap about any part of the construction of the machine. The dimensions are as follows: Total length of bed, 21 inches; total length of machine, 25½ inches; length of milled bed, 12½ inches; drills to the center of a 7¾-inch circle; spindle runs 4 inches; extreme distance from chuck to tail stock, 7¼ inches; total hight from bench to top of balance wheel, 10 inches; net weight, 17 pounds, and weight boxed, 23 pounds. The machine is put on the market by Goodell-Pratt Company, Greenfield, Mass.

## The Diamond Nozzle.

The accompanying cuts show a nozzle throwing a spray and a solid stream. The nozzle is finished on the inside, as well as on the outside, to reduce friction and




*The Diamond Nozzle.*

# PAINTS, OILS AND COLORS

### White Lead, Zinc, &c.—

| | ₱ lb |
|---|---|
| Lead, English white, in Oil | 9½@ 9¾ |
| Lead, American white, in Oil: | |
| Lots of 500 lb or over | @ 6½ |
| Lots less than 500 lb | @ 7 |
| In Barrels | @ 6 |
| Lead, White, in oil, 25 lb tin pails, add to keg price | @ ⅛ |
| Lead, White, in oil, 12½ lb tin pails, add to keg price | @ 1 |
| Lead, White, in oil, 1 to 5 lb ass'ted tins, add to keg price | @ 1½ |
| Lead, American. Terms: For lots 12 tons and over ¼¢ rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net. | ₱ lb |
| Lead, White, Dry in bbls | @ 6 |
| Zinc, American, dry | 4½@ 4¾ |
| Zinc, French: | |
| Paris, Red Seal, dry | 8½ |
| Paris, Green Seal, dry | 9½ |
| Antwerp, Red Seal, dry | 7½ |
| Antwerp, Green Seal, dry | 8½ |
| Zinc, V. M. French, in Poppy Oil: | |
| Green Seal: | |
| Lots of 1 ton and over | 11⅞@12° |
| Lots of less than 1 ton | 12⅛@12° |
| Zinc, V. M. French, in Poppy Oil: | |
| Red Seal: | |
| Lots of 1 ton and over | 10⅝@11⅛ |
| Lots of less than 1 ton | 10⅞@11⅜ |

Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or mixed grades, 1%; 25 bbls., 2%; 50 bbls., 4%.

### Dry Colors—

| | ₱ lb |
|---|---|
| Black, Carbon | 5 @10 |
| Black, Drop, Amer | 4 @ 6 |
| Black, Drop, Eug | 5 @15 |
| Black, Ivory | 16 @20 |
| Lamp, Com | 4½@ 6 |
| Blue, Celestial | 4 @ 6 |
| Blue, Chinese | 29 @32 |
| Blue, Prussian | 27 @30 |
| Blue, Ultramarine | 4½@15 |
| Brown, Spanish | ½@ 1 |
| Carmine, No. 40 | $3.55@4.00 |
| Green, Chrome, ordinary | 3½@ 6 |
| Green, Chrome, pure | 17 @25 |
| Lead, Red, bbls., ⅛ bbls. and kegs: | |
| Lots 500 lb or over | @ 6½ |
| Lots less than 500 lb | @ 7 |
| Litharge, bbls., ⅛ bbls. and kegs: | |
| Lots 500 lb or over | @ 6½ |
| Lots less than 500 lb | @ 7 |
| Ocher, American | ₱ ton $8.50@16.00 |
| Orcher, American Golden | 2½@ 3½ |
| Orcher, French | 1¾@ 2¾ |
| Orcher, Foreign Golden | 3 @ 4 |
| Orange Mineral, English | 8¾@10½ |
| Orange Mineral, French | 10½@11¼ |
| Orange Mineral, German | 7¾@10 |
| Orange Mineral, American | 8 @ 8¼ |
| Red, Indian, English | 4½@ 8½ |
| Red, Indian, American | 3 @ 3¼ |
| Red, Turkey, English | 4 @10 |
| Red, Tuscan, English | 7 @10 |
| Red, Venetian, Amer. | ₱ 100 lb $0.50@1.25 |
| Red Venetian, English | 100 lb $1.15@1.75 |
| Sienna, Italian, Burnt and Powdered | 3 @ 9½ |
| Sienna, Ital., Raw, Powd | 3 @ 6½ |
| Sienna, American, Raw | 1½@ 2 |
| Sienna, American, Burnt and Powdered | 1½@ 2 |
| Talc, French | ₱ ton $20.00@30.00 |
| Talc, American | ₱ ton $13.75@25.00 |
| Terra Alba, French | ₱ 100 lb 90 @1.00 |
| Terra Alba, English | ₱ 100 lb 90 @1.00 |
| Terra Alba, American, ₱ 100 lb. | No 1 .60 @70 |
| Terra Alba, American, ₱ 100 lb. | No 2 .45 @50 |
| Umber, T'key, Bnt. & Pow | 2½@ 3½ |
| Umber, Turkey, Raw & Pow | 2½@ 3½ |
| Umber, Burnt, Amer | 1½@ 2 |
| Umber, Raw, Amer | 1½@ 2 |
| Yellow, Chrome | 11 @14 |
| Vermilion, American Lead | 10 @25 |
| Vermilion, Quicksilver, bulk | @65 |
| Vermilion, Quicksilver, bags | @66 |
| Vermilion, English, Import | 75 @80 |
| Vermilion, Chinese | $0.90@1.00 |

### Colors in Oil—

| | ₱ lb |
|---|---|
| Black, Lampblack | 12 @14 |
| Blue, Chinese | 36 @46 |
| Blue, Prussian | 32 @36 |
| Blue, Ultramarine | 13 @16 |
| Brown, Vandyke | 11 @14 |
| Green, Chrome | 10 @15 |
| Green, Paris | @24 |
| Sienna, Raw | 12 @15 |
| Sienna, Burnt | 12 @15 |
| Umber, Raw | 11 @14 |
| Umber, Burnt | 11 @14 |

### Miscellaneous—

| | |
|---|---|
| Barytes, White, Foreign | ₱ ton $17.50@20.00 |
| Barytes Amer. floated | ₱ ton 16.00@17.00 |
| Barytes, Crude, No. 1 | ₱ ton 10.00@11.00 |
| Chalk, in bulk | ₱ ton 3.00@ 3.25 |
| Chalk, in bbls | ₱ 100 lb @ .35 |
| China Clay, English | ₱ ton 11.00@17.00 |
| Cobalt, Oxide | ₱ 100 lb 2.50@ |
| Whiting, Common | ₱ 100 lb .45@ .48 |
| Whiting, Gilders | ₱ 100 lb .55@ .57 |
| Whiting, Ex. Gilders | ₱ 100 lb .58@ .60 |

### Putty—

| | ₱ lb |
|---|---|
| In bladders | 1¾@2 |
| In bulk | ₱ 100 lb 1.05@1.15 |
| In cans, 1 lb to 5 lb | 2¼@4 |
| In cans, 12½ to 25 lb | 1¾@2 |

### Spirits Turpentine— ₱ gal.

| | |
|---|---|
| In Oil bbls | 53 @53½ |
| In machine bbls | 53½@54 |

### Glue—

| | ₱ lb |
|---|---|
| Cabinet | 11 @15 |
| Common Bone | 6 @ 8 |
| Extra White | 18 @24 |
| Foot Stock, White | 11 @14 |
| Foot Stock, Brown | 7 @10 |
| German Hide | 12 @18 |
| French | 10 @40 |
| Irish | 13 @16 |
| Low Grade | 8 @11 |
| Medium White | 14 @17 |

### Gum Shellac—

| | ₱ lb |
|---|---|
| Bleached Commercial | 42 @44 |
| Bone Dried | 51 @54 |
| Button | 45 @60 |
| Diamond I | 59 @.. |
| Fine Orange | 52 @54 |
| As O. Garnet | 45 @46 |
| D. C | 1.00 @1.10 |
| Octagon B | 55 @56 |
| T. N | 47 @50 |
| V. S. O | 60 @.. |

### Animal, Fish and Vegetable Oils—

| | ₱ gal. |
|---|---|
| Linseed, City, raw | 43 @44 |
| Linseed, City, boiled | 45 @46 |
| Linseed, State and West'n, raw | 41 @.. |
| Linseed, raw Calcutta seed | @65 |
| Lard, Prime, Winter | 57 @59 |
| Lard, Extra No. 1 | 48 @49 |
| Lard, No. 2 | 36 @38 |
| Cotton-seed, Crude, f.o.b. mills | 17½@18 |
| Cotton-seed, Summer Yellow, Prime | 24¾@25 |
| Cotton-seed, Summer Yellow, off grades | 24 @24½ |
| Sperm, Crude | 60 @.. |
| Sperm, Natural Spring | @.. |
| Sperm, Bleached Spring | @.. |
| Sperm, Natural Winter | 62 @64 |
| Sperm, Bleached Winter | 65 @67 |
| Tallow, Prime | 48 @50 |
| Whale, Crude | @.. |
| Whale, Natural Winter | 45 @.. |
| Whale, Bleached Winter | 47 @.. |
| Menhaden, Brown, Strained | 27 @28 |
| Menhaden, Light, Strained | 28 @29 |
| Menhaden, Bleached Winter | 30 @32 |
| Menhaden, Ex-Bld. Winter | 32 @33 |
| Menhaden, Southern | 19½@20 |
| Cocoanut, Ceylon | ₱ lb 6¾@ 6¾ |
| Cocoanut, Cochin | ₱ lb 7¾@ 7½ |
| Cod, Domestic, Prime | 36 @38 |
| Cod, Newfoundland | 39 @41 |
| Red Elaine | 32 @33 |
| Red Saponified | ₱ lb 4½@ 4¾ |
| Olive, Italian, bbls | 52 @55 |
| Neatsfoot, prime | 50 @51 |
| Palm, prime Lagos | ₱ lb 5¾@ 6 |

### Mineral Oils—

| | ₱ gal. |
|---|---|
| Black, 29 gravity, 15 cold test | 12 @13 |
| Black, 29 gravity, 15 cold test | 12 @13 |
| Black, Summer | 11 @12 |
| Cylinder, light filtered | 18½@19½ |
| Cylinder, dark filtered | 16½@17½ |
| Paraffine, 903-907 gravity | 13 @13½ |
| Paraffine, 903 gravity | 12 @12½ |
| Paraffine, 883 gravity | 9¾@10 |
| Paraffine, red | 12 @13¾ |

In small lots ½¢ advance.

# Current Hardware Prices.

**General Goods.**—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

**Special Goods.**—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

**Range of Prices.**—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

**Names of Manufacturers.**—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1904, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

**Standard Lists.**—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

**Additions and Corrections.**—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

## Adjusters, Blind—

Domestic, ₱ doz. $3.00.....33⅓%
North's .....10%
Zimmerman's—See Fasteners, Blind.

### Window Stop—

Ives' Patent.....35%
Taplin's Perfection.....35%

## Ammunition— See *Caps, Cartridges, Shells, &c.*

## Anvils—American—

Eagle Anvils.....₱ lb 7¼@7¾¢
Hay-Budden, Wrought.....9@9¼¢
Horseshoe brand, Wrought.....9@9¼¢
Trenton .....₱ lb 9@9¼¢

### Imported—

Peter Wright & Sons.....₱ lb 10½¢

## Anvil, Vise and Drill—

Millers Falls Co., $18.00.....15&10%

## Apple Parers— See *Parers, Apple, &c.*

## Aprons, Blacksmiths'—

Hull Bros. Co.....30&10%
Livingston Nail Co.....33⅓%

## Augers and Bits—

*Com. Double Spur....75@75&10%*
*Boring Mach. Augers.70&10@75%*
*Car Bits, 12-in. twist..60@60&10%*
*Jennings' Pattern..60&10&10@70%*
Ford's Auger and Car Bits.....40&5
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list..25%
No. 30, R. Jennings' list.....49&7½%
Russell Jennings'.....25&10&2½%
L'Hommedieu Car Bits.....15%
Mayhew's Countersink Bits.....45%
Millers Falls.....50&10&7½%
Ohio Tool Co.'s Bailey Auger and Car Bits.....40&10%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist....60&10%
Wright's Jennings' Bits (R. Jennings list) .....50%

### Bit Stock Drills—

See *Drills, Twist.*

### Expansive Bits—

Clark's small, $18; large, $26....50&10%
Clark's Pattern, No. 1, ₱ doz. $26; No. 2, $18.....50&10%
Ford's, Clark's Pattern.....50&10&60%
C. E. Jennings & Co., Steer's Pat..25%
Swan's .....60%

### Gimlet Bits—

*Common Dble. Cut..gro.$3.00@3.25*
*German Pattern....gro.$4.50@4.75*

### Hollow Augers—

*Bonney Pat., per doz..$9.00@10.00*
Ames .....25&10%
New Patent.....25&10%
Universal .....20%
Wood's Universal.....25%

## Ship Augers and Bits—

Ford's .....40%
C. E. Jennings & Co.:
L'Hommedieu's .....15%
Watrous' .....35&5%
Ohio Tool Co.'s.....40%
Snell's .....40%

## Awl Hafts— See *Hafts, Awl.*

## Awls—

*Brad Awls:*
*Handled .....gro. $2.75@3.00*
*Unhdld, Shldered...gro.63@66¢*
*Unhandled, Patent..gro.66@70¢*
*Peg Awls:*
*Unhandled, Patent..gro. 31@34¢*
*Unhdld, Shldered..gro. 65@70¢*
*Scratch Awls:*
*Handled, Com...gro. $3.50@4.00*
*Handled, Socket..gro.$11.50@12.00*
Hurwood .....40%

## Awl and Tool Sets— See *Sets, Awl and Tool.*

## Axes—

*Single Bit, base weights, (up to 3½ lb.)*
*First Quality.....$6.50*
*Second Quality.....$5.75*
*NOTE.—Heavier Weights add Extras as per regular schedule.*

## Axle Grease —

See *Grease, Axle*

## Axles— *Iron or Steel*

*Concord, Loose Collar...4¼@4¾¢*
*Concord, Solid Collar...4¾@5¼¢*
*No. 1 Common, Loose...3¼@3¾¢*
*No. 1½ Com., New Style3¾@4¼¢*
*No. 2 Solid Collar.....4@4½¢*
*Nos. 7, 8, 11 and 12....75@75&5%*
*Nos. 13 to 14.....70&10@75&5%*
*Nos. 15 to 18.....75&10@75&10&5%*
*Nos. 19 to 22.....75&10@75&10&5%*

### Boxes, Axle—

*Common and Concord, not turned lb., 5¼@5¾¢*
*Common and Concord, turned. lb., 5¼@6¢*
*Half Patent.....lb. 8¼@9¢*

## Bait— Fishing—

Hendryx:
A Bait.....20%
B Bait.....25%
Competitor Bait.....20&5%

### Balances— Sash—

Caldwell new list.....50%
Pullman .....50&10@60%

### Spring—

*Spring Balances.....60@60&5%*
Chatillon's:
Light Spg. Balances.....40&10%
Straight Balances.....40%
Circular Balances.....50%
Large Dial.....30%

## Barb Wire—See *Wire, Barb.*

### Bars— Crow—

*Steel Crowbars, 10 to 40 lb.... per lb. 2½@2¾¢*

### Towel

No. 10 Ideal, Nickel Plate..₱ gro. $8.50

## Beams, Scale—

*Scale Beams.....40&10@50%*
Chattillon's No. 1.....30%
Chattillon's No. 2.....40%

### Beaters, Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered ₱ doz. $0.85; Tinned .....$1.00
No. 11 Wire Coppered ₱ doz. $1.10; Tinned .....$1.20
No. 10 Wire Galvanized..₱ doz. $1.75
Western W. G. Co.:
No. 1 Electric.....₱ gro. $7.80
No. 2 Buffalo.....₱ gro. $9.00
No. 3 Perfection Dust.....₱ gro. $8.00

### Egg—

Holt-Lyon Co.:
Holt, No. A, Japanned....₱ doz. $1.20
Holt, No. 1, Tinned.....₱ doz. $1.50
Holt, No. B, Japanned....₱ doz. $2.00
Holt, No. 2, Tinned.....₱ doz. $2.25
Lyon, No. 2, Japanned....₱ doz. $1.25
Lyon, No. 3, Japanned....₱ doz. $1.50
Taplin Mfg. Co.:₱ gro.
No. 60 Improved Dover.....$6.00
No. 75 Improved Dover.....$6.50
No. 100 Improved Dover.....$7.00
No. 102 Improved Dover, Tin'd. $8.50
No. 150 Improved Dover, Hotel..$15.00
No. 152 Imp'd Dover, Hotel, T'd.$17.00
No. 200 Imp'd Dover Tumbler....$8.50
No. 202 Imp'd Dover Tumbler, T'd.$9.50
No. 300 Imp'd Dover Mammoth, ₱ doz. .....$25.00
Western, W. G. Co., Buffalo.....$7.00
Wonder (S. S. & Co.).₱ gro. net, $6.00

## Bellows—

*Blacksmith, Standard List.. 60&10@70&10%*

### Blacksmiths'—

*Inch.. 30 32 34 36 38 40*
*Each.$3.25 3.50 4.00 4.50 5.00 5.75*
*Extra Length:*
*Each.$3.75 4.25 4.75 5.25 6.00 7.00*

### Hand—

*Inch... 6 7 8 9 10*
*Doz..$4.50 5.00 5.50 6.00 6.50*

### Molders—

*Inch. 9 10 11 12 14*
*Doz. $8.00 9.00 10.50 12.50 14.50*

*Net Prices.*

### Bells— Cow—

*Ordinary goods...75&5@75&10&5%*
*High grade.....70&10@70&10&5%*
Jersey .....75&10%
Texas Star.....50%

### Door—

Abbe's Gong.....45%
Burton Gong.....50%
Home, R. & E. Mfg. Co.'s.....55&10%
Lever and Pull, Sargent's....60&10&10%
Trip Gong.....50&10@50&10&5%
Yankee Gong.....55%

### Hand—

*Hand Bells, Polished, Brass.. 60&5@60&10&5%*
*White Metal.....60%*
*Nickel Plated....50&10@50&10&5%*
*Swiss .....60@60&7½%*
Cone's Globe Hand Bells.....33⅓@35
Silver Chime.....33⅓@35

### Miscellaneous—

*Farm Bells.....lb. 2¼¢*
*Steel Alloy Church and School 50&10&5@60&5%*
American Tube & Stamping Co. Gongs .....75%
Table Call Bells.....50@50&10%

### Belting— Leather—

*Extra Hvy, Short Lap.60@60&5%*
*Regular Short Lap...65&10@70%*
*Standard .....70&5@70&10%*
*Light Standard.....70&10@75%*
*Cut Leather Lacing.....60&10%*
*Leather Lacing Sides, per sq. ft. 17½@18¢*

### Rubber—

*Agricultural (Low Grade).... 75@75&5%*
*Common Standard....70@70&10%*
*Standard .....65&70%*
*Extra .....60&5@60&10%*
*High Grade.....50&5@50&10%*

## Bench Stops— See *Stops, Bench*

## Benders and Upsetters, Tire—

Detroit Perfected Tire Bender.....40%
Green River Tire Benders and Upsetters .....20%
Detroit Stoddard's Lightning Tire Upsetters, No. 1, $4.25; No. 2, $7.25; No. 3, $10.50; No. 4, $16.25; No. 5, $20.50.

## Bicycle Goods—

John S. Leng's Son's 1902 list:
Chain .....50%
Parts .....50%
Spokes .....50%
Tubes .....60%

## Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

## Blocks— Tackle—

*Common Wooden....70&10@75&5%*
Hartz St. Tackle Blocks.....50@50&5%
Hollow Steel Blocks, with Ford's Patent Sheaves.....50&10%
Lane's Patent Automatic Lock and Junior .....30%
Stowell's Novelty, Mal. Iron....50&10%
Stowell's Self Loading.....60%
See also Machines, Hoisting.

## Boards, Stove—

*Zinc, Crystal, &c...30&10@40&10%*

## Boards, Wash—

See *Washboards.*

## Bobs, Plumb—

Keuffel & Esser Co.....33⅓%

## Bolts—

### Carriage, Machine, &c.—

*Common Carriage (cut thread): ⅝ x 6 and Smaller.....75&5%*
*Larger and Longer.....70&5%*
*Phila. Eagle,$3.00 list May 21,'99 80&10%*
*Bolt Ends, list Feb.14,'95.75@75&5%*
*Machine, ⅝ x 4 and smaller 75&7½%*
*Machine, larger and longer.. 70&7½%*

### Door and Shutter—

*Cast Iron Barrel, Japanned, Round Brass Knob:*
*Inch..... 3 4 5 6 8*
*Per doz.$0.30 .35 .45 .56 .75*
*Cast Iron Spring Foot, Jap'd:*
*Inch..... 6 8 10*
*Per doz.....$1.15 1.50 2.00*
*Cast Iron Chain, Flat, Japanned:*
*Inch..... 6 8 10*
*Per doz.....$0.95 1.25 1.55*
*Cast Iron Shutter, Japanned, Brass Knobs:*
*Inch..... 6 8 10*
*Per doz.....$0.80 .90 1.00*
*Wrt Barrel Japd.....80@80&10%*
*Wrt " Bronzed.....50@50&10%*
*Wrt. Spring...70&10@70&10&10%*
*Wrt. Shutter.....50&50&10&10%*
*Wrt. Square Neck.....75@75&10%*
*Wrt Square.66⅔&10@66⅔&10&10%*
*Ives' Patent Door.....60%*

### Stove and Plow—

*Plow .....70&10@70&10&5%*
*Stove .....82½@82½&5%*

### Tire—

*Common .....72½%*
*Norway Iron.....80%*
American Screw Company:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Bay State, list Dec. 28, '99.....72½%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Eclipse, list Dec. 28, '99.....72½%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....72½%
Norway Phila., list Oct., '84.....80%
Upson Nut Co.:
Tire Bolts.....72½%

## Borers, Tap—

*Borers Tap, Ring, with Handle:*
*Inch..... 1¼ 1½ 1¾ 2*
*Per doz...$4.80 5.60 6.40 8.00*
*Inch .....2¼ 2½*
*Per doz.....$8.65 11.50*
Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.65; No. 3, $2.50 each.....25%

## Boxes, Mitre—

C. E. Jennings & Co.....30%
Langdon .....15&10
Perfection .....₱ doz. $30.00
Schatz .....40%

## Braces—

*Common Ball, American.$1.15@1.25*
Barber's .....50&10&10@60&10
Fray's Genuine Spofford's.....60%
Fray's No. 79 to 120, 81 to 123, 207 to 414 .....60%
C. E. Jennings & Co.....50&5%
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Pat...50%
Millers Falls Drill Braces.....25&10%
P., S. & W. Co., Peck's Pat.60&10@65%

## Brackets—

*Wrought Steel...80&10@80&10&5%*
Bradley's Wire Shelf:
Full cases.....80&10&10%
Broken cases.....80&10%
Griffin's Pressed Steel.....80%
Griffin's Folding Brackets.....70&10%
Stowell's Cast Shelf.....75%
Stowell's Sink.....50%
Western, W. G. Co., Wire.....60&10%

## Bright Wire Goods— See *Wire and Wire Goods.*

## Broilers—

Western, W. G. Co.....80%
Wire Goods Co.....75@75&10%

## Buckets, Galvanized—

Price per dozen.

| Quart..... | 10 | 12 | 14 |
|---|---|---|---|
| *Water, Regular...* | *1.40* | *1.70* | *1.90* |
| *Water, Heavy....* | *3.40* | *3.70* | *3.80* |
| *Fire, Rd. Bottom..* | *2.30* | *2.55* | *2.95* |
| *Well .....* | *2.55* | *2.87* | *3.15* |

## Bucks, Saw—

Hoosier.....₱ gro. $36.00

## Bull Rings— See *Rings, Bull*

## Butts— Brass—

*Wrought, list Sept., '96.....30%*
Cast Brass, Tiebout's.....50%

### Cast Iron—

*Fast Joint, Broad....40&10@50%*
*Fast Joint, Narrow...40&10@50%*
*Loose Joint.....70&5@75%*
*Loose Pin.....70&5@75%*
*Mayer's Hinges.....70&5@75%*
*Parliament Butts.....70&5@75%*

### Wrought Steel—

*Table and Back Flaps...75%*
*Narrow and Broad.....75%*
*Inside Blind.....75&10%*
*Loose Pin.....75%*
*Loose Pin, Ball and Steeple Tip .....50&20%*
*Japanned Ball Tip Butts... 75&10%*
*Bronzed, Wrt., Nar. and Inside Blind Butts....55&10%*

*Extra 3 or 4 foot.*

## Cages, Bird—

Hendryx Brass:
3000, 5000, 1100 series.....5%
1200 series.....33⅓%
200, 300, 600 and 900 series.....40&10%
Hendryx Bronze:
700, 800 series.....40&10%
Hendryx Enameled.....40&10%

### Calipers—See *Compasses.*

### Calks, Toe and Heel—

*Blunt, 1 prong.....per lb.4¢4¼¢*
*Sharp, 1 prong...per lb., 4½@4¾¢*
Gautier, Blunt.....4@4¼¢
Gautier, Sharp.....4½@4¾¢
Perkins', Blunt Toe.....₱ lb 3.65¢
Perkins', Sharp Toe.....₱ lb 4.15¢

### Can Openers—

See *Openers, Can.*

### Cans, Milk—

| | 5 | 8 | 10 gal. |
|---|---|---|---|
| Illinois Pattern..... | $1.35 | 1.85 | 2.05 each. |
| New York Pattern.. | 1.50 | 2.20 | 2.45 each. |
| Baltimore Pattern.. | 1.50 | 2.20 | 2.45 each. |
| Dubuque ..... | 1.35 | 1.60 | 1.75 each. |

### Cans, Oil—

Buffalo Family Oil Cans:

| 3 | 5 | 10 gal. |
|---|---|---|
| $18.00 | 60.00 | 129.60 gro., net. |

### Caps, Percussion—

*Eley's E. B.....52@55¢*
*G. D.....per M 34@35¢*
*F. L.....per M 40@42¢*
*G. E.....per M 48@50¢*
*Musket .....per M 62@63¢*

### Primers—

*Berdan Primers, $2 per M..20&5%*
*B. L. Caps (Sturtevant Shells) $2 per M.....20%*
*All other primers per M.$1.52@1.60*

### Cartridges—

*Blank Cartridges:*
*32 C. F., $5.50.....10&5%*
*38 C. F., $7.00.....10&5%*
*22 cal. Rim, $1.50.....10&5%*
*32 cal. Rim, $2.75.....10&5%*
*B. B. Caps, Con. Ball, Swgd..$1.90*
*B. B. Caps, Round Ball....$1.49*
*Central Fire.....25%*
*Target and Sporting Rifle..15&5%*
*Primed Shells and Bullets.15&10%*
*Rim Fire, Sporting.....50%*
*Rim Fire, Military.....15&5%*

### Casters—

*Bed .....70@70&10%*
*Plate .....60&10@60&10&5%*
*Philadelphia .....75@75&10%*
Acme, Ball Bearing.....33⅓%
Boss .....70&10%
Boss Anti-Friction.....70&10%
Gem (Roller Bearing).....80%
Martin's Patent (Phoenix).....45%
Standard Ball Bearing.....45%
Tucker's Patent low list.....30%
Yale (Double Wheel) low list.....50%

### Cattle Leaders—

See *Leaders, Cattle.*

### Chain, Coil—

*American Coil, Straight Link:*

| 3-16 | ¼ | 5-16 | ⅜ | 7-16 | ½ | 9-16 |
|---|---|---|---|---|---|---|
| 7.40 | 5.10 | 4.15 | 3.45 | 3.30 | 3.20 | 3.15 |
| ⅝ | ¾ | ⅞ | 1 to 1¼ inch. | | | |
| 3.10 | 3.00 | 2.95 | 2.95 per 100 lb. | | | |

*German Coil.....60&10&10@70%*

### Halters and Ties—

*Halter Chains...60&10@60&10&10%*
*German Pattern Halter Chains, list July 2½, '97.....60&10&10%*
*Cow Ties.....60@60&10%*

### Trace, Wagon, &c.—

*Traces, Western Standard: 100 pr.*
*6½—6-3, Str'ght, with ring..$23.50*
*6½—6-2, Str'ght, with ring..$24.50*
*6½—8-2, Str'ght, with ring..$28.00*
*6½—10-2, Str'ght, with ring.$32.00*
*NOTE.—Add 2c per pair for Hooks. Twist Traces 2c per pair higher than Straight Link.*
*Trace, Wagon and Fancy Chains .....60&5@60&10&5%*

### Miscellaneous—

*Jack Chain, list July 10, '93:*
*Iron .....60&10@60&10&5%*
*Brass .....60&10@50&10&10%*
*Safety Chain.....75@75&10&5%*
*Gal. Pump Chain.....lb. 5@5¼*
Covert Mfg. Co.:
Breast .....40&2%
Halter .....40&2%
Heel .....40&2%
Rein .....40&2%
Stallion .....40&2%
Covert Sad. Works:
Breast .....70%
Halter .....70%
Hold Back.....70%
Rein .....70%
Oneida Community:
Am. Coil and Halters.....40@40&5%
Am. Cow Ties.....45@50%
Eureka Coil and Halter....45@50&5%
Niagara Coil and Halter....45@50&5%
Niagara Cow Ties.....45&5@50&10&5%
Niagara Wire Dog Chains..45@50&5%
Wire Goods Co.:
Dog Chain.....70&10%
Universal Dbl. Jointed Chain.....50%

### Chalk—(From Jobbers.)

*Carpenters' Blue.....gro. 35@38¢*
*Carpenters' Red.....gro. 30@33¢*
*Carpenters' White....gro. 25@28¢*
See also Crayons.

### Checks, Door—

Bardsley's .....45%
Columbia .....50&10%
Eclipse .....60&10%

### Chests, Tool—

American Tool Chest Co.:
Boy's Chests, with Tools.....55%
Youths' Chests, with Tools.....40%
Gentlemen's Chests, with Tools..30%
Farmers', Carpenters', etc., Chests, with Tools.....20%
Machinists' and Pipe Fitters' Chests, Empty.....50%
Tool Cabinets.....50%
C. E. Jennings & Co.'s Machinists' Tool Chests.....33⅓&10%

### Chisels—

**Socket Framing and Firmer**

*Standard List.....70&10@75&10%*
Buck Bros.....30%
Charles Buck.....30%
C. E. Jennings & Co. Socket Firmer No. 10.....60%
C. E. Jennings & Co. Socket Framing No. 15.....60%
Ohio Tool Co.'s.....70%
Swan's .....70%
L. & I. J. White.....30@30&5%

**Tanged—**

*Tanged Firmers....40&5@40&10%*
Buck Bros.....30%
Charles Buck.....30%
C. E. Jennings & Co. No. 191, 181..25%
L. & I. J. White, Tanged.....25&5%

**Cold—** *lb.*

*Cold Chisels, good quality..13@15¢*
*Cold Chisels, fair quality..11@12¢*
*Cold Chisels, ordinary... 9@10¢*

### Chucks—

Beach Pat., each $8.00.....35&5%
Pratt's Positive Drive.....25%
Empire .....25%
Blacksmiths' .....25%
Skinner Patent Chucks:
Independent Lathe Chucks.....50%
Universal .....50%
Combination .....50%
Drill Chucks, New Model.....30%
Drill Chucks, Standard.....40%
Drill Chucks, Skinner Pat., 0, 1, 2, 4.....40%
Drill Chucks, Skinner Pat., 3, 5, 6, 7, 8.....30%
Drill Chucks, Positive Drive.....30%
Planer Chucks.....25%
Face Plate Jaws.....40%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination .....50%
Czar Drill.....35%
Combination Geared Scroll.....40%
Geared Scroll.....40%
Independent .....50%
Independent Steel.....40%
Union Drill.....45%
Universal .....50%
Independent Iron F. Plate Jaws.40%
Independent Steel F. Plate Jaws.40%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill..50%
Little Giant Drill, Improved.....50%
Oneida Drill.....50%
Scroll Combination Lathe.....50%

### Clamps—

Adjustable, Hammers'.....20@20&5%
Cabinet, Sargent's.....50&10%
Carriage Makers', P. S. & W. Co..50%
Carriage Makers', Sargent's.....60%
Besly, Parallel.....33⅓&10%
Lineman's, Utica Drop Forge & Tool Co. .....40%
Saw Clamps, see Vises, Saw Filers'.

### Cleaners, Drain—

Iwan's Champion, Adjustable.....55%
Iwan's Champion, Stationary.....45%

### Sidewalk—

Star Socket, All Steel..₱ doz. $4.05 net
Star Shank, All Steel..₱ doz. $3.24 net
W. & C. Shank, All Steel, ₱ doz., 7½ in., $3.00; 8 in., $3.25.

### Cleavers, Butchers'—

Foster Bros.....30%
New Haven Edge Tool Co.'s.....45%
Fayette R. Plumb.....33⅓&33⅓&10%
L. & I. J. White.....30%

### Clippers—

Chicago Flexible Shaft Company:
'98 Chicago Horse.....$8.75 } 15%
1902 Chicago Horse.....$10.75 }
20th Century Horse, each, $5.00...20%
Lightning Belt.....$15.00 } 15%
Chicago Belt.....$20.00 }
Stewart's Patent Sheep, $12.75....20%

### Finger Nail Clippers—

Smith & Hemenway Co.₱ doz. net $2.00

### Clips, Axle—

*Eagle, 5-16 and ⅜ in..75@75&10%*
*Norway, 5-16 and ⅜ in..60&10@70%*

### Cloth and Netting, Wire

—See *Wire, &c.*

### Cocks, Brass—

*Hardware list:*
*Compression, Plain Bibbs, Globe, Kerosene, Racking, &c., Cocks.....70&10@75%*

### Coffee Mills—

See *Mills, Coffee.*

### Collars, Dog—

Nickel Chain, Walter B. Stevens & Son's list.....40%
Leather, Walter B. Stevens & Son's list .....40%

### Combs, Curry—

Metal Stamping Co.....40%

### Mane and Tail—

Covert's Saddlery Works.....60&10%

### Compasses, Dividers, &c.

*Ordinary Goods....75&5@75&10%*
Bemis & Call Hdw. & Tool Co.:
Dividers .....65%
Calipers, Double.....65%
Calipers, Inside or Outside.....65%
Calipers, Wing.....60%
Compasses .....50%

### Conductor Pipe, Galva.—

*L. C. L. to Dealers:*

| *Territory.* | *Nested.* | *Not nested.* |
|---|---|---|
| *A Eastern.....* | *75&5%* | *75%* |
| *B. Eastern.....* | *75&10%* | *75&5%* |
| *Central .....* | *75&5%* | *70&10&5%* |
| *Southern .....* | *70&7½%* | *70&2½%* |
| *S. Western....* | *70&5%* | *70%* |

*Terms, 60 days; 2% cash 10 days. Factory shipments generally delivered.*
See also Eave Troughs.

### Coolers, Water—

| Gal. each.. | 2 | 3 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| Labrador ... | $1.20 | $1.50 | $1.80 | $2.10 | $2.70 |
| Gal..... | 3 | 4 | 6 | 8 | |
| Iceland, ea.. | $1.80 | $2.10 | $2.40 | $3.00 | |
| Gal..... | 2 | 3 | 4 | 6 | 8 |
| Galv. Lined, ea. | $1.85 | $2.00 | $2.25 | $2.90 | $3.90 25% |

Gavl. Lined, side handles,

| Gal. | 2 | 3 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| Each. | $1.95 | $2.15 | $2.40 | $3.30 | $4.15..25% |

### Coopers' Tools—

See *Tools, Coopers'.*

### Cord— Sash—

*Braided, Drab.....lb. 35¢*
*Braided, White, Com..lb.22@23½¢*
*Cable Laid Italian..... lb., A, 18¢; B, 16¢*
*Common India.....* lb. *10@10½¢*
*Cotton Sash Cord, Tw'ted..11@17¢*
*Patent Russia.....lb...@14¢*
*Cable Laid Russia....lb...@15¢*
*India Hemp, Braided..lb...@18¢*
*India Hemp, Twisted..lb. 12@13¢*
*Patent India, Twisted..lb. 12@13¢*
Anniston Cordage Co.: Braided Cotton.
Old Glory, Nos. 7 to 12....₱ lb 28 ¢
Anniston, Nos. 7 to 12....₱ lb 22 ¢
Old Colony, Nos. 7 to 12....₱ lb 22 ¢
Anniston Drab, Nos. 7 to 12.₱ lb 26 ¢
Pearl Braided, cotton, No. 6, ₱ lb, 23½¢; No. 7, 22½¢; Nos. 8 to 12, 22¢.
Eddystone Braided, Nos. 7, 8, 9 and 10 .....₱ lb 24 ¢
Eddystone Braided Cotton, No. 6.. ₱ lb 25 ¢
Harmony Cable Laid Italian, Nos. 7 to 10.....₱ lb 23 ¢
Peerless:
Cable Laid Italian.....16 ¢
Cable Laid Russian.....14 ¢
Cable Laid India.....12 ¢
Braided India.....18 ¢
Samson, Nos. 8 to 12:
Braided, Drab Cotton.....₱ lb 40 ¢
Braided, Italian Hamp....₱ lb 40 ¢
Braided, Linen.....₱ lb 55 ¢
Braided, White Cotton or Spot.... ₱ lb 35 ¢
Massachusetts, White.....₱ lb 28 ¢
Massachusetts, Drab.....₱ lb 32 ¢
Phoenix, White, Nos. 8 to 12, 24¢; No. 7, 24½¢; No. 6, 25½¢.
Silver Lake:
A quality, Drab.....40 ¢
A quality, White.....35 ¢
B quality, Drab.....35 ¢
B quality, White.....30 ¢
Italian Hemp.....40 ¢
Linen .....57½¢

### Wire, Picture—

*List Oct., '00..... 85&10&10@85&10&10&5%*
Hendryx Standard Wire Picture Cord, 85&10&5%

### Cradles—

*Grain .....40&12½%*

### Crayons—

*White Round Crayons, gr. 5½@6¢*
*Cases, 100 gro., $4.00, at factory.*
D. M. Steward Mfg. Co.: (Case lots, 20%)
Jumbo Crayons.....gr. $3.50
Metal Workers' Crayons, gr. $2.50
Soapstone Pencils, round, flat or square.....gr. $1.50
Rolling Mill Crayons.....gr. $2.50
Railroad Crayons (composition) gr. $2.00
Zelnicker's Lumber:
Red, Blue, Green.....₱ gro. $6.50
Black .....₱ gro. $4.00
See also Chalk.

### Crooks, Shepherds'—

Fort Madison, Heavy.....₱ doz. $7.00
Fort Madison, Light.....₱ doz. $6.50

### Crow Bars—See *Bars, Crow.*

### Cultivators—

Victor Garden.....50%

### Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1847.₱ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor .....₱ doz. $3.00
Wm. Rogers & Son.....₱ doz. $2.50

### Cutters— Glass—

H. H. Mayhew Co.....40%
Red Devil.....50%
Smith & Hemenway Co.....50%
Woodward .....40%

### Meat and Food—

American .....30%

| Nos..... | 1 | 2 | 3 | 4 | B | 5 |
|---|---|---|---|---|---|---|
| Each..... | $5 | $7 | $10 | $25 | $50 | $60 |

Enterprise .....25@25&7½%

| Nos..... | 5 | 10 | 12 | 22 | 32 |
|---|---|---|---|---|---|
| Each..... | $2 | $3 | $2.75 | $4.50 | $6 |

Dixon's.....₱ doz. 30&10@40%

| Nos..... | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| | $14.00 | $17.00 | $19.00 | $30.00 |

Ideal .....40&10@50%
Little Giant.....₱ doz. 33⅓@40%

| Nos.... | 305 | 310 | 312 | 320 | 322 |
|---|---|---|---|---|---|
| | $35.00 | $48.00 | $44.00 | $72.00 | $68.00 |

N. E. Food Choppers.....40%
New Triumph No. 605, ₱ doz. $24.00.. 30&10@40%
Russwin Food, No. 1, $24.00; No. 2, $27.00 .....45&10&10%
Woodruff's .....₱ doz. 30&10@40%

| Nos..... | 100 | 150 |
|---|---|---|
| | $15.00 | $18.00 |

Enterprise Beef Shavers.....25@30%

### Slaw and Kraut—

Henry Disston & Sons:
Slaw, Corn Grater, &c.....40%
Kraut Cutters, 24 x 7, 26 x 8, 30 x 9.....55%
Kraut Cutters, 36 x 12, 40 x 12....40%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife....₱ doz. $3.00
Combined Slaw Cutter and Corn Grater .....₱ doz. $4.00
Tucker & Dorsey Mfg. Co.:
Kraut Cutters.....40%
Slaw Cutters, 1 Knife..₱ gr. $18@$20
Slaw Cutters, 2 Knife..₱ gr. $22@$36

### Tobacco—

*All Iron, Cheap..doz. $4.25@$4.50*
Enterprise .....25@30%
National, ₱ doz., No. 1, $21; No. 2, $18 .....40%
Sargent's, ₱ doz., No. 2.....60%
Sargent's, Nos. 12 and 21.....60&10%

### Washer—

Appleton's, ₱ doz., $16.00....50&10&10%

## Diggers, Post Hole, &c.—

Dalbey Post Hole Auger..per doz., $9.00
Iwan's Imp'ved Post Hole Auger.40&5%
Iwan's Vaughan Pattern Post Hole Augers .....₱ doz. $6.25
Iwan's Perfection Post Hole Digger.. ₱ doz. $8.25
Iwan's Split Handle Post Hole Diggers .....₱ doz. $7.25
Kohler's Universal.....₱ doz. $15.00
Kohler's Little Giant.....₱ doz. $12.00
Kohler's Hercules.....₱ doz. $10.00
Kohler's Invincible.....₱ doz. $9.00
Kohler's Rival.....₱ doz. $8.00
Kohler's Pioneer.....₱ doz. $7.20
Never-Break Post Hole Diggers, ₱ doz., $24.00.....60%
Samson, ₱ doz. $34.00.....25%

### Dividers—See *Compasses.*

### Doors, Screen—

Phillips', style E, ⅞ in.....₱ doz. $10.50
Phillips', style 077, ⅞ in.....₱ doz. $8.00
Phillips', style x-y, ⅞ in.....₱ doz. $11.00

### Drawers, Money—

Tucker's Pat. Alarm Till No. 1, ₱ doz., $18; No. 2, $15; No. 3, $12; No. 4, $18.

### Drawing Knives—

See *Knives, Drawing.*

### Dressers, Emery Wheel—

Diamond Emery Wheel Dressers....35%
Diamond Wheel Dresser Cutters....35%

### Drills and Drill Stocks—

*Common Blacksmiths' Drill, each .....$1.50@$1.75*
Breast, Millers Falls.....15&10%
Breast, P. S. & W.....40&5%
Goodell Automatic Drills..40&5@40&10%
Johnson's Automatic Drills, Nos. 2 and 3.....16⅔%
Johnson's Drill Points.....16⅔%
Millers Falls Automatic Drills.33⅓&10%
Ratchet, Curtis & Curtis.....25%
Ratchet, Parker's.....40%
Ratchet, Weston's.....33⅓%
Ratchet, Whitney's, P. S. & W..50%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00.....33⅓%

### Twist Drills—

*Bit Stock.....60&10@60&10&10%*
*Taper and Straight Shank.... 60&10@60&10&5%*

### Drivers, Screw—

*Screw D'ver Bits, per doz..45@60¢*
Balsey's Screw Holder and Driver, ⅜ doz., 2½-in., $6; 4-in., $7.50; 6-in., $9 .....40%
Buck Bros.' Screw Driver Bits.....30%
Champion .....50%
Edson .....60%
Fray's Hol. H'dle Sets, No. 3, $12..50%
Gay's Double Action Ratchet.....35%
Goodell's Auto..50&10&10@50&10&10&5%
Hurwood .....40%
Mayhew's Black Handle.....40%
Mayhew's Monarch.....40&10%
Millers Falls, Nos. 20 and 21...25&10%
Millers Falls, Nos. 11, 12, 41, 42..15&10%
Never Turn.....60%
New England Specialty Co.....50%
Sargent & Co.'s:
Nos. 1 and 60.....50&10&10%
Nos. 50 and 55.....60&10%
Nos. 20 and 40.....70&10%
Smith & Hemenway Co.....40&5%
H. D. Smith & Co.'s Perfect H'dle.40%
Stanley R. & L. Co.'s:
No. 64, Varn. Handles..60@60&10&10%
No. 86.....70@70&10&10%
Swan's:
Nos. 65 to 68.....50%
No. 40.....40&10%
Nos. 25, 35 and 45.....20&10&10%

## Eave Trough, Galvanized—

| *Territory.* | *L. C. L.* |
|---|---|
| *A, Eastern.....* | *80&7½%* |
| *B, Eastern.....* | *80&12½%* |
| *Central .....* | *80&7½%* |
| *Southern .....* | *70&20&10%* |
| *S, Western.....* | *75&12½%* |

*Terms.—2% for cash. Factory shipments generally delivered.*
See also Conductor Pipe and Elbows.

### Elbows and Shoes—

*Factory shipments:*
*Plain Rd., and Cor., 2, 3 and 4 in.....75&10%*
*Plain Rd., and Cor., 5 and 6 in. .....60%*
Perfect Elbows (8., S. & Co.).....40%

### Emery, Turkish—

| | *4 to 6* | *5 to 150* | *Flour* |
|---|---|---|---|
| *Kegs .....lb.* | *5 ¢* | *5½¢* | *5¾¢* |
| *½ Kegs.....lb.* | *5¼¢* | *5¾¢* | *5¾¢* |
| *Kegs .....lb.* | *5 ¢* | *6 ¢* | |
| *10-lb. cans, 10 in case.....* | *6½¢* | *7 ¢* | *6 ¢* |
| *10-lb. cans, less than 10.....10* | *¢* | *10 ¢* | *8 ¢* |

*NOTE.—In lots 1 to 3 tons a discount of 10% is given.*

### Extractors, Lemon Juice

—See *Squeezers, Lemon.*

## Fasteners, Blind—

Zimmerman's .....50&10%
Walling's .....45%

### Cord and Weight—

Ives .....40%

### Faucets—

*Cork Lined* .....50@50&10%
*Metallic Key, Leather Lined* .. 60&10@60&10&5%
*Red Cedar* .....40@40&10%
*Petroleum* .....70&10@75%
B. & L. B. Co.:
Metal Key.....60&10%
Star .....60%
West Lock.....50&10%
John Sommer's Peerless Tin Key....40%
John Sommer's Boss Tin Key.....50%
John Sommer's Victor Mtl. Key.50&10%
John Sommer's Duplex Metal Key..60%
John Sommer's Diamond Lock.....40%
John Sommer's I. X. L. Cork Lined...50%
John Sommer's Reliable Cork Lined.. 50&10%
John Sommer's Chicago Cork Lined.60%
John Sommer's O. K. Cork Lined...50%
John Sommer's No Brand, Cedar....50%
John Sommer's Perfection, Cedar....40%
McKenna, Brass:
Burglar Proof, N. P.....25%
Improved, ¾ and ⅞ inch.....25%
Self Measuring:
Enterprise, ₱ doz. $36.00.....40&10%
Lane's, ₱ doz. $36.00.....40&10%
National Measuring, ₱ doz. $36.40&10%

### Felloe Plates—

See *Plates, Felloe.*

### Files— Domestic—

*List revised Nov. 1, 1899.*
*Best Brands*.....70&10@75&5%
*Standard Brands*.75&10@75&10&10%
*Lower Grade*....75&10&10@80&10%

### Imported—

*Stubs' Tapers, Stubs' list, July 24, '97*.....30%

### Fixtures, Fire Door—

Richards Mfg. Co.:
Universal, No. 103.....$4.00
Special, No. 104.....$4.00
Fusible Links.....$0.25
Expansion Bolts.....50&10%

### Grindstone—

*Net Prices:*

| *Inch* | *15* | *17* | *19* | *21* | *24* |
|---|---|---|---|---|---|
| *Per doz.* | *$2.15* | *2.85* | *3.25* | *3.75* | *4.50* |

P., S. & W. Co.....30&10@40%
Reading Hardware Co.....60%
Sargent's .....70%
Stowell's Giant Grindstone Hanger.. ₱ doz. $6.00
Stowell's Grindstone Fixtures, Extra Heavy .....50&10&10%
Stowell's Grindstone Fixtures, Light. 60&10%

### Fodder Squeezers—

See *Compressors.*

### Forks—

*Base Discounts Aug. 1, 1899, list:*
*Hay, 2 tine*.....50&10&5%
*Boys' & Fish, 2 tine*..50&10&5%
*Hay & Boys', 3 tine*....*C5&5%*
*Hay & Boys', 4 tine*....66⅔%
*Champion Hay*.....66⅔%
*Hay & Header, long 3 tine*.65%
*Header, 4 tine*.....65%
*Barley 4 & 5 tine, Steel*..60&20%
*Manure, 4 tine*.....60&15&2½%
*Manure, 5 & 6 tine*..66⅔&2½%
*Spading* .....70&2½%
*Potato Digger, 6 tine*....60&10%
*Sugar Beet*.....40&10%
*Coke & Coal*.....40&10%
*Heavy Mill & Street*.....65%
Iowa Dig-Ezy Potato.....60&10%
Victor, Hay.....60&15&2½%
Victor, Manure.....66⅔%
Victor, Header.....65%
Champion, Hay.....66⅔%
Champion, Header.....65%
Champion, Manure.....60&15&2½%
Columbia, Hay.....60&20%
Columbia, Manure.....70%
Columbia, Spading.....70&12½%
Hawkeye Wood Barley.....40%
W. & C. Potato Digger.....60&10%
Acme Hay.....60&20%
Acme Manure, 4 tine.....60&10&5%
Dakota Header.....60&20%
Jackson Steel Barley.....60&20%
Kansas Header.....65%
W. & C. Favorite Wood Barley.....40%
Plated.—See Spoons.

### Frames— Saw—

*White, S'g't Bar, per doz*.75@80¢
*Red, S'g't Bar, per doz*..$1.00@1.25
*Red, Dbl. Brace, per doz*.$1.40@1.50

### Freezers, Ice Cream—

| *Qt.* | *1* | *2* | *3* | *4* | *6* |
|---|---|---|---|---|---|
| *Each* | *$1.25* | *$1.60* | *$1.90* | *$2.20* | *$2.80* |

### Fruit and Jelly Presses—

See *Presses, Fruit and Jelly.*

### Fry Pans—See *Pans, Fry.*

### Fuse— *Per 1000 Feet.*

*Hemp* .....$2.75
*Cotton* .....3.20
*Waterproof Sgl. Taped*..3.65
*Waterproof Dbl. Taped*..4.40
*Waterproof Tpl. Taped*..5.15
10&2½%

### Gates, Molasses and Oil—

*Stebbins' Pattern*.80&10@80&10&5%

### Gauges—

*Marking, Mortise, &c*.....
50&10&5@50&10&10&5%
Chapin-Stephens Co.:
Marking, Mortise, &c.50&10@50&10&10%
Scholl's Patent.....50&10@50&10&10%
Door Hangers.....50@50&10%
Stanley R. & L. Co.'s Butt and Rabbet Gauge.....20@20&10&10%
Wire, Brown & Sharpe's.....25%
Wire, Morse's.....25%
Wire, P., S. & W. Co.....30&10%

### Gimlets— Single Cut—

*Nail, Metal, Asst., gro*..$1.40@1.50
*Spike, Metal, Asst., gro*.$2.80@3.50
*Nail, Wood Handled, Assorted, gro.* $1.75@2.00
*Spike, Wood Handled, Assorted, gro.* $4.25@4.50

### Glass, American Window

See *Trade Report.*

### Glasses, Level—

Chapin-Stephens Co.....60@60&10&10%

### Glue, Liquid Fish—

*Bottles or Cans, with Brush*.. 25@50%
*Cans (½ pts., pts., qts., ½ gal., gal.)* .....25@48%
International Glue Co. (Martin's)... 40&10%

### Grease, Axle—

*Common Grade*....*gro. $4.50@5.50*
Dixon's Everlasting..10-lb pails, ea. 85¢
Dixon's Everlasting, in boxes, ₱ doz. 1 lb, $1.20; 2 lb, $2.00

### Grips, Nipple—

Perfect Nipple Grips.....40&10&2%

### Griddles, Soapstone—

Pike Mfg. Co.....33⅓@33⅓&10%

### Grindstones—

Bicycle Emery Grinder.....$6.50
Bicycle Grindstones, each.....$2.50@3.00
Pike Mfg. Co.:
Improved Family Grindstones, per inch, ₱ doz.....$2.00 } 33⅓%
Pike Mower and Tool Grinder, each .....$6.00 }
Velox Ball Bearing, Mounted, Angle Iron Frames, each.....$3.25

## Halters and Ties—

Covert Mfg. Co.:
Web .....45%
Jute Rope.....50&5%
Sisal Rope.....35&5%
Cotton Rope.....45&2%
Hemp Rope.....45&2%
Covert's Saddlery Works:
Web and Leather Halters.....70%
Jute and Manila Rope Halters....70%
Sisal Rope Halters.....60&20%
Jute, Manila and Cotton Rope Ties.70%
Sisal Rope Ties.....60&10%

### Hammers—

### Handled Hammers—

Heller's Machinists'...40&10@40&10&10%
Heller's Farriers.....40&10@40&10&10%
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50, $1.75.....40@40&10&10%
Peck, Stow & Wilcox.....40&10&5%
Fayette R. Plumb:
Plumb, A. E. Nail.....
33⅓&7½@33⅓&10&7½%
Engineers' and B. S. Hand.....
50&7½&5@50&10&7½&5%
Machinists' Hammers.50&5@50&10&5%
Riveting and Tinners'.....
40&2½@40&10&2½%
Sargent's C. S. New List.....40%

### Heavy Hammers and Sledges—

*Under 3 lb., per lb. 50¢* .....
80&10&10@85%
*3 to 5 lb., per lb. 40¢* .....
80&10&10@85%
*Over 5 lb., per lb 30¢*..85@85&10%
*Wilkinson's Smiths'*...lb. 9½@10¢

### Handles—

### Agricultural Tool Handles

*Axe, Pick, &c*.....60@60&10%
*Hoe, Rake, &c*.....45@50&5%
*Fork, Shovel, Spade, &c.:*
*Long Handles*.....45@50&5%
*D Handles*.....40%

### Cross-Cut Saw Handles—

Atkins' .....40&5%
Champion .....45@45&10%
Disston's .....50%

### Mechanics' Tool Handles—

*Auger, assorted*...*gro. $2.50@2.85*
*Brad Awl*.....*gro. $1.65@1.85*
*Chisel Handles:*
*Apple Tanged Firmer, gro. assorted* .....$2.40@2.65
*Hickory Tanged Firmer, gro. assorted* .....$2.15@2.40
*Apple Socket Firmer, gro. assorted* .....$1.75@1.95
*Hickory Socket Firmer, gro. assorted* .....$1.45@1.60
*Hickory Socket Framing, gro. assorted* .....$1.60@1.75
*File, assorted*.....gro. *$1.30@1.40*
*Hammer, Hatchet, Axe, &c.* 60&10@60&10&10%
*Hand Saw, Varnished, doz. 80&85¢; Not Varnished*..65@75¢
*Plane Handles:*
*Jack, doz. 30¢; Jack, Bolted.75¢*
*Fore, doz. 45¢; Fore, Bolted.90¢*
Chapin-Stephens Co.:
Carving Tool.....40@40&10%
Chisel .....65@65&10%
File and Awl.....65@65&10%
Saw and Plane.....40@40&10%
Screw Driver.....40@40&10%
Millers Falls Adj. and Ratchet Auger Handles .....15&10%
Nicholson Simplicity File Handle.... ₱ gro. $0.85@$1.50

### Hangers—

*NOTE.—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c*
*Barn Door, New Pattern, Round Groove, Regular:*

| *Inch* | *3* | *4* | *5* | *6* | *8* |
|---|---|---|---|---|---|
| *Single Doz.* | *$0.90* | *1.25* | *1.60* | *1.95* | *2.50* |

*Barn Door, New England Pattern, Check Back, Regular:*

| *Inch* | *3* | *4* | *5* | *6* |
|---|---|---|---|---|
| *Single Doz.* | *$1.30* | *1.85* | *2.50* | *3.00* |

Alith Mfg. Co.:
Reliable, No. 1.....per doz. $8.00
Reliable, No. 2.....per doz. $9.60
Chicago Spring Butt Co.:
Friction .....25%
Oscillating .....25%
Big Twin.....25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door.....50%
Elevator .....30%
Railroad .....50%
Cronk & Carrier Mfg. Co.:
Loose Axle.....60&10&5%
Roller Bearing.....70&5%
Griffin Mfg. Co.:
Solid Axle, No. 10, $12.00.....70%
Roller Bearing, No. 11, $15.00.70%
Roller Bearing, Ex. Hy.. No. 22, $18.00.....70%
Hinged Hangers, $16.00....60&10%
Lane Bros. Co.:
Parlor, Ball Bearing.....$4.00
Parlor, Standard.....$3.15
Parlor, No. 105.....$2.85
Parlor, New Model.....$2.80
Parlor, New Champion.....$2.25
Barn Door, Standard.60&10&2½%
Hinged.....net $6.40
Covered .....60&10%
Special .....70&5%
Lawrence Bros.:
Advance .....60&10%
Cleveland .....70&5%
Clipper, No. 75.....60%
Crown .....60&10%
Easy Parlor Door, Dbl. Sets, $2.50; Single Sets, $1.25.
Giant .....60&5%
Hummer .....70&5%
New York.....60&10%
Peerless .....70&5%
Sterling .....60&10%
McKinney Mfg. Co.:
No. 1, Special, $15.....60&10%
No. 2, Standard, $18.....60&10%
Hinged Hangers, $16.....50
Meyers' Stayon Hangers.....60%
Richards Mfg. Co.:
Pioneer Wood Track No. 3..$2.15
Ball B'r'g St'l Track No. 10..$2.40
Roller B'r'g St'l Track No. 12..$2.50
Ball B'r'g St'l Track No. 13..$2.40
Roller B'r'g St'l Track No. 14..$2.50
Hero, Adj. Track No. 19.....50%
Adjustable Track Tandem Trolley Track No. 16.....50
Seal, Steel Track No. 8.....$2.40
Auto Adj. Track No. 22...40&10
Trolley B. D. No. 17.....$1.40
Trolley F. D. No. 120.....$2.35
Trolley F. D. No. 121.....$2.45
Trolley F. D. No. 150.....$2.60
Safety Underwriters F. D. No. 101 .....$2.25
Tandem No. 44.....70&5%
Trolley F. D. No. 151.....$3.00
Palace, Adjustable Track No. 132 .....40&10%
Royal, Adjustable Track No. 122 .....40&10%
Ives' Wood Track No. 1.....$2.15
Trolley B. D. No. 20.....$1.35
Trolley B. D. No. 24.....$1.45
Trolley B. D. No. 27.....$1.50
Trolley B. D. No. 28.....$1.66
Roller Bearings Nos. 39, 40, 41, 43, 44.....70&5%
Anti-friction No. 42.....60&10
Hinged Tandem No. 48.....60
Folding Door B. B. Swivel No. 135 .....30
Safety Door Ranger Co.:
Storm King Safety.....60
U. S. Standard Hinge.....60
Stowell Mfg. & Foundry Co.:
Acme Parlor Ball Bearing....40
Ajax Hinge Door.....60
Apex Parlor Door.....50&10&5
Atlas .....60%
Baggage Car Door.....50
Climax Anti-Friction.....50&10
Elevator .....40
Express .....50%
Freight Car Door.....60
Interstate .....60&10
Lundy Parlor Door.....50&10
Magic .....60
Matchless .....60&10
Nansen .....70&5%
Parlor Door.....50&10
Railroad .....50&10
Rex Hinge Door.....60
Street Car Door.....50
Steel, Nos. 300, 401, 500....50&10
Underwriters' Fire Door.....40
Wild West Warehouse Door..50
Zenith for Wood Track....50&10%
A. L. Sweet Iron Works:
Check Back.....70%
Climax Anti-Friction.....50&10
Eagle .....70
Hylo Hinge.....60
New Perfection.....60
Pilot .....60
Pilot Hinge.....60
Rider Wooster.....65
Western Pattern.....70
Taylor & Boggis Fty Co.'s Kidder's Roller Bearing.50&15&10&5%
Wilcox Mfg. Co.:
Bike Roller Bearing.....60&10%
C. J. Roller Bearing.....60&10
Cycle Ball Bearing.....50
Dwarf Ball Bearing.....40
Ives Wood Track.....60&10
L. T. Roller Bearing...60&10&5
New Era Roller Bearing..50&10
O. K. Roller Bearing..60&10&5
Prindle, Wood Track.....60
Richards' Wood Track.....60
Richards' Steel Track.....50&10
Spencer Roller Bearing....60&10
Tandem, Nos. 1 and 2.....60
Underwriters' Roller Bearing..40
Velvet .....50
Wilcox Auditorium Ball B'r'g..20
Wilcox Barn Trolley No. 123..40
Wilcox Elv. Door, Nos. 112 and 122½.....50
Wilcox Elv. Door, No. 132....40
Wilcox Fire Trolley, Roller Bearing.....30
Wilcox Le Roy Noiseless Ball Bearing .....40
Wilcox New Century..50&10&10
Wilcox O. K. Steel Track....50
Wilcox O. K. Trolley.....50
Wilcox Trolley Ball Bearing..40
Wilcox Wideman Narrow Gauge Ball Bearing.....40%
For Track, see Rail.

Extra 5&10% often given.

### Hangers— Garment—

Pullman Trouser, No. 1....₱ gro. $9.00
Pullman Trouser, No. 4....₱ gro. $24.00
Victor Folding.....₱ gro. $9.60
Western, W. G. Co.....70&10%

### Gate—

Myers' Patent Gate Hangers, ₱ doz. net .....$4.50

### Hasps—

McKinney's Perfect Hasp, ₱ doz..50%

### Hatchets—

*Regular list, first quality*..40@..%
*Second quality $1.00 per doz. less than first quality.*

### Heaters, Carriage—

Clark, No. 5, $1.75; No. 5B, $2.00; No. 3, $2.25; No. 3D, $2.75; No. 7D, $3.00; No. 3E, $3.25; No. 1, $3.50.....15%
Clark Coal, ₱ doz. $0.75.....10%

### Hinges—

### Blind and Shutter Hinges—

*Surface Gravity Locking Blind: (Victor; National; 1868 O. P.; Niagara; Clark's O. P.; Clark's Tip; Buffalo.)*

| *No.* | *1* | *3* | *5* |
|---|---|---|---|
| *Doz. pair* | *$0.75* | *1.35* | *2.70* |

*Mortise Shutter: (L. & P., O. S., Dixie, &c.)*

| *No.* | *1* | *1½* | *2* | *2½* |
|---|---|---|---|---|
| *Doz. pair* | *$0.70* | *.65* | *.60* | *.55* |

*Mortise Reversible Shutter (Buffalo, &c.):*

| *No.* | *1* | *1½* | *2* |
|---|---|---|---|
| *Doz. pair* | *$0.70* | *.65* | *.60* |

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50.....10%
Parker .....70&75%
Reading's Gravity.....60
Sargent's, Nos. 1, 3, 5, 11 and 13..75%
Stanley's Steel Gravity Blind Hinges, ₱ doz. sets, without screws, $0.90; with screws, $1.20.
Wrightsville Hardware Co.:
O. S., Lull & Porter.....75&10&5
Acme, Lull & Porter.....75&10
Queen City Reversible.....75&10
Shepard's Noiseless, Nos. 60, 65, 55 .....75&10
Niagara, Gravity Locking, Nos. 1, 3 & 5.....75&10&5
1868, Old Pat'n, Nos. 1, 3 & 5.... 75&10&5
Tip Pat'n, Nos. 1, 3 & 5...75&10&5
Buffalo Gravity Locking, Nos. 1, 3 & 5.....75&10&5
Shepard's Double Locking, Nos. 20 & 25.....70
Champion Gravity Locking, No. 75.75
Steamboat Gravity Locking, No. 10.75
Pioneer, Nos. 060, 45 & 5½.....75
Empire, Nos. 101 & 103.....70%
W. H. Co.'s Mortise Gravity Locking, No. 2.....60%

### Gate Hinges—

*Clark's or Shepard's—Doz. sets:*

| *No.* | *1* | *2* | *3* |
|---|---|---|---|
| *Hinges with L't'es* | *$2.00* | *2.70* | *5.00* |
| *Hinges only* | *1.40* | *2.05* | *3.80* |
| *Latches only* | *.70* | *.70* | *.35* |

*New England:*
*With Latch*.....*doz.* ...*@$2.00*
*Without Latch*..*doz.* ...*@$1.60*
*Reversible Self-Closing:*
*With Latch*.....*doz.* ...*@$1.75*
*Without Latch*..*doz.* ...*@$1.35*
*Western:*
*With Latch*.....*doz. $1.75*
*Without Latch*.....*doz. $1.15*
Wrightsville Hardware Co.:
Shepard's or Clark's, doz. sets,

| Nos. | 1 | 2 | 3 |
|---|---|---|---|
| Hinges with Latches | $2.00 | 2.70 | 5.00 |
| Hinges only | 1.40 | 2.05 | 3.80 |
| Latches only | .70 | .70 | 1.35 |

### Pivot Hinges—

Bommer Bros., Pivot.....40%
Lawson Mfg. Co. Matchless.....45%

### Spring Hinges—

*Holdback Cast Iron*.....
*gro. $9.00@$9.50*
*Non-Holdback, Cast Iron*.....
*gro. $8.00@$8.50*
J. Bardsley:
Bardsley's Non-Checking Mortise Floor Hinges.....45
Bardsley's Patent Checking..15
Bommer Bros.:
Bommer Ball Bearing Floor Hinges .....40%
Bommer Spring Hinges.....40%
Chicago Spring Butt Co.:
Chicago Spring Hinges.....25%
Triple End Spring Hinges....50%
Chicago (Ball Bearing) Floor Hinge .....50%
Garden City Engine House....25%
Keene's Saloon Door.....25%
Columbian Hardware Co.:
Acme, Wrought Steel.....30%
Acme, Brass.....25%
American .....30%
Columbia, No. 14.....₱ gr. $9.00
Columbia, No. 18.....₱ gr. $25.00
Columbia, Adjustable, No. 7. ₱ gr. $12.00
Gem, new list.....30%
Clover Leaf.....₱ gr. $12.50
Oxford, new list.....30%
Lawson Mfg. Co., Matchless....30%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges .....40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door.....$9.00
Chief Ball B'r'g Floor Hinge.50%
Ohio Detachable Screen Door Hinge .....₱ gr. $12.00
The Stover Mfg. Co.:
Ideal, No. 16, Detachable, ₱ gr. $12.50
Ideal, No. 4.....₱ gr. $9.00
New Idea No. 1.....₱ gr. $9.00
New Idea, Double Acting....45%
New Idea Floor.....45%
Van Wagoner:
Ball Bearing.....25%
No. 777 Sh't Steel Holdb'k.₱ gro. pr.$9

Extra 10% often given on most of these Hinges.

### Wrought Iron Hinges—

*Strap and T Hinges, &c., list December 20, 1904:*

*Light Strap Hinges*...70%
*H'vy Strap H'g's*...75&5%
*Light T Hinges*.....65%
*Heavy T Hinges*.....60%
*Extra H'y T H'g's*.70&10%
*Hinge Haspa*.....50%
*Cor. Heavy Strap*..75&5%
*Cor. Ex. Heavy T*.70&10%

*Base discounts subject to extras*

*Screw Hook and Strap.*
*6 to 12 in*..*lb.* 3¼¢
*1½ to 20 in*..*lb.* 3 ¢
*22 to 36 in*..*lb.* 2¾¢

*Screw Hook and Eye:*
*¾ to 1 inch*.....*lb.* 6 ¢
*⅝-inch*.....*lb.* 7 ¢
*½-inch*.....*lb.* 9 ¢

### Hitchers, Stall—

Covert Mfg. Co., Stall Hitchers....35%

### Hods— Coal—

| | *Per doz.* | | | |
|---|---|---|---|---|
| *Inch* | *15* | *16* | *17* | *18* |
| *Galv. Open* | *$2.50* | *2.75* | *3.00* | *3.25* |
| *Jap. Open* | *$1.90* | *2.10* | *2.25* | *2.55* |
| *Galv. Funnel* | *$3.00* | *3.30* | *3.60* | *3.90* |
| *Jap. Funnel* | *$2.45* | *2.65* | *2.85* | *3.30* |

### Masons, Etc.—

Cleveland Wire Spring Co.:
Steel Mortar.....each $1.45
Steel Brick.....each $1.10

### Hoes— Eye—

*Scovil and Oval Pattern*.....
60&10@60&10&10%
*Grub, list Feb. 23, 1899*.....
70&10@75&10%
D. & H. Scovil.....35%

### Handled—

*August 1, 1899, list.*

*Field and Garden*.....70&10%
*Smith's Patent*.....50%
*Meadow & Rhode Island*..75%
*Black Diamond*.....70&10%
*Mortar and Street*...70&10&10%
*Planters'*.....75&12½%
*Cotton*.....70&10&10%
*Cotton Chopper*.....75&12½%
*Weeding Hoes*.....66⅔&15%
*Steel Weeders*.....66⅔&15%
*Malleable Weeders*....66⅔&15%
Ft. Madison Cotton Hoe....70&10&10%
Ft. Madison Crescent Cultivator Hoe, ℔ doz.....70&10%
Ft. Madison Mattock Hoes:
Regular Weight.....℔ doz. 66⅔%
Junior Size.....℔ doz. $4.00
Ft. Madison Sprouting Hoe..℔ doz. 50%
Ft. Madison Dixie Tobacco Hoe.....
75&10&7½%
Kretsinger's Cut Easy.....70&10%
Warren Hoe.....45&10%
W. & C. Ivanhoe.....75&2%
B. B. 6 in., Cultivator Hoe.....$3.15
B. B., 6½ in.....$3.35
Acme Wedding.....℔ doz., net, $4.35
W. & C. L'tning Shuffle Hoe, ℔ doz.$4.85

### Hoisting Apparatus—

See *Machines, Hoisting.*

### Holders— Bit—

Angular, ℔ doz. $24.00.....45&10%

### Door—

Empire.....50%
Bardsley's.....45%

### File and Tool—

Nicholson File Holders and File Handles.....33⅓&40%

### Hooks—Cast Iron—

Bird Cage, Reading.....60%
Bird Cage, Sargent's List.....60&10%
Ceiling, Sargent's List.....50&10&10%
Clothes Line, Reading List.....60&10%
Clothes Line, Sargent's List.50&20&10%
Coat and Hat, Sargent's List...50&10%
Clothes Line, Stowell's.....70%
Coat and Hat, Reading.....45&20%
Coat and Hat, Stowell's.....70%
Coat and Hat, Wrightsville.....65%
Harness, Reading List.....66⅔%
Harness, Stowell's.....60%
School House, Stowell's.....70%

### Wire—

*Belt*.....*80&10@..*%
*Wire C. & H. Hooks:*.....
75&10@75&10&5%
Atlas, Coat and Hat:
Single Cases.....75%
10 Case Lots.....75&10%
Columbian Hdw. Co., Gem.....60&10%
Parker Wire Goods Co., King..75&10%
Van Wagoner, Coat and Hat.....70%
Western W. G. Co, Molding.....75%
Wire Goods Co.:
Acme.....60&10%
Chief.....70%
Crown.....70&10%
Czar.....65%
V Brace.....70&10%
Czar Harness.....50&10%

### Wrought Iron—

*Box, 6 in., per doz., $1.00; 8 in., $1.25; 10 in., $2.50.*
*Cotton*.....*doz. $1.05@$1.25*
Wrought Staples, Hooks, &c.—
See Wrought Goods.

### Miscellaneous—

*Hooks, Bench,* see *Stops, Bench.*
*Bush, Light, doz. $4.75; Medium, $5.35; Heavy, $6.25*
*Grass*....*Nos.* *1* *2* *3* *4*
*Best*.....*$1.50* *1.75* *2.00*
*Common*...*$1.30* *1.30* *1.40* *1.60*
*Potato and Manure*.....60&15%
*Whiffletree*.....*lb.* 5¾@6¢
*Hooks and Eyes:*
*Brass*.....60&10&10@70%
*Malleable Iron*.....70&10@75%
Covert Mfg. Co. Gate and Scuttle Hooks.....35%
Covert Saddlery Works' Self Locking Gate and Door Hook.....60%
Ft. Madison Cut-Easy Corn Hooks, ℔ doz. $3.25 net
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

### Horse Nails—

See *Nails, Horse.*

### Horseshoes—

See *Shoes, Horse.*

### Hose, Rubber—

*Garden Hose. ¾-inch:*
*Competition*.....*ft. 5 @ 6 ¢*
*3-ply Standard*.....*ft. 8 @ 9 ¢*
*4-ply Standard*.....*ft. 10 @11 ¢*
*3-ply extra*.....*ft. 11 @13 ¢*
*4-ply extra*.....*ft. 14 @16 ¢*
*Cotton Garden, ¾-in., coupled:*
*Low Grade*.....*ft. 8 @ 9 ¢*
*Fair Quality*.....*ft. 10 @11 ¢*

### Irons— Sad—

*From 4 to 10*.....*lb.* 2¾@3 ¢
*B. B. Sad Irons*.....*lb.* 3¼@3½¢
*Chinese Laundry*....*lb.* 4¾@5 ¢
*Chinese Sad*.....*lb.* 4 @4¼¢
*Mrs. Potts', cents per set:*

| *Nos.* | *50* | *55* | *60* | *65* |
|---|---|---|---|---|
| *Jap'd Tops* | *62* | *59* | *72* | *69* |
| *Tin'd Tops* | *65* | *62* | *75* | *72* |

*New England Pressing*..*lb.* 3¾@4¢

### Pinking—

*Pinking Irons*.....*doz. 50@60¢*

### Soldering—

*Soldering Coppers, 2½ & 3*..*20@21¢*
*1½ & 2*.....*22@23¢*

### Jacks, Wagon—

Covert Mfg. Co.:
Auto Screw.....30&5%
Steel.....45&2%
Covert's Saddlery Works:
Daisy.....60&10%
Victor.....60%
Lockport.....50%
Lane's Steel.....30&10&5%
Richards' Tiger Steel, No. 130.....40%

### Kettles—

*Brass, Spun, Plain*.....*20@25%*
Enameled and Cast Iron—See Ware, Hollow.

### Knives—

### Butcher, Kitchen, &c.—

Foster Bros.' Butcher, &c.....30%
Smith & Hemenway Co.....40&10%
Wilkinson Shear & Cutlery Co.....50%

### Corn—

Withington Acme, ℔ doz., $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

### Drawing—

*Standard List*....*70&10@75&10%*
C. E. Jennings & Co., Nos. 45, 46..60%
Jennings & Griffin, Nos. 41, 42.....60%
Ohio Tool Co.'s.....70%
Swan's.....70&10&2½%
Watrous.....16%
L. & I. J. White.....20&5@25%

### Hay and Straw—

*Serrated Edge*.....*per doz. $5.50*
Iwan's Sickle Edge.....℔ doz. $9.50
Iwan's Serrated.....℔ doz. $10.00

### Mincing—

Buffalo.....℔ gro. $13.00

### Miscellaneous—

*Farriers'*.....*doz. $3.00@3.25*
Wostenholm's.....℔ doz. $3.00@3.25

### Knobs—

*Base, 2½-inch, Birch, or Maple, Rubber tip*.....gro.*$1.15@1.20*
*Carriage, Jap., all sizes*.....
*gro. 40@45¢*
*Door, Mineral*.....*doz. $3.00@3.60*
*Door, Por. Jap'd*.....*doz. 70@75¢*
*Door, Por. Nickel*..*doz. $2.05@2.15*
Bardsley's Wood Door, Shutters, &c.15%
Picture, Sargent's.....60&10&10%

### Lacing, Leather—

See *Belting, Leather—*

### Ladders, Store, &c.—

Lane's Store.....25%
Myers' Noiseless Store Ladders....50%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....40%
Climax Shelf, No. 113.....40%
Trolley, No. 109.....40%

### Ladles, Melting—

L. & G. Mfg. Co. (low list).....25%
P. S. & W.....50%
Reading.....60%
Sargent's.....50&10%

### Lanterns—Tubular—

*Regular Tubular, No. 0*.....
*doz. $4.35@4.75*
*Lift Tubular, No. 0*..*doz. $4.75@5.25*
*Hinge Tubular, No. 0*.....
*doz. $4.75@5.25*
*Other Styles*....*40&10@40&10&5%*

### Bull's Eye Police—

*No. 1, 2¾-inch*.....*$2.50@2.75*
*No. 2, 3-inch*.....*$2.75@3.00*

### Lasts and Stands, Shoe—

Stowell's Atlas, Malleable Iron.....50%
Stowell's Badger, Cast Iron.....50%

### Latches— Thumb—

*Roggin's Latches, with screw*..
*doz. 35@40¢*

### Door—

Richards' Bull Dog, Heavy No. 125.40%
Richards' Trump, No. 127.....50%

### Leaders, Cattle—

*Small*.....*doz. 50¢; large, 60¢*
Covert Mfg. Co.....35%

### Lifters, Transom—

R. & E.....33⅓%

### Lines—

| *Wire Clothes, Nos.* | *18* | *19* | *20* |
|---|---|---|---|
| *100 feet* | *$2.20* | *2.00* | *1.65* |
| *75 feet* | *$1.80* | *1.70* | *1.30* |

Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3..40%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50.....℔ gr. 20%
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50.....20%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50.....20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25.....20%
Anniston Waterproof Clothes, 50 ft., ℔ gro., $24.00; Gilt Edge, $22.00; Air Line, $22.00; Acme, $17.00; Alabama, $15.00; Empire, $14.00; Advance, $13.50; Oriole, $20.00; Albemarle, $13.50; Eclipse, $12.50; Chicago, $11.00; Standard, $10.00; Columbia, $8.50; Allston, $12.50; Calhoun, $11.00.

### Locks— Cabinet—

*Cabinet Locks*...*33⅓@33⅓&7½%*

### Door Locks, Latches, &c.—

*NOTE.—Net Prices are very often made on these goods.*
Reading Hardware Co.....45&20%
R. & E. Mfg. Co.....40%
Sargent & Co.....40&10%
Stowell's Steel Door Latches.....50%

### Elevator—

Stowell's.....50%

### Padlocks—

*Wrought Iron*....*75&10&5@80&5%*
R. & E. Mfg. Co. Wrought Steel and Brass.....75@75&10%

### Sash, &c.—

Ives' Patent:
Bronze and Brass.....62½%
Crescent.....50&10%
Iron.....62½%
Window Ventilating.....60%
Robison Patent Ventilating Sash Lock.....40%
Wrought Bronze and Brass.....55%
Wrought Steel.....55%
Pullman Patent Ventilating Lock..25%
Reading.....60%

### Machines—Boring—

*Com. Upr't, without Augers*..*$2.00*
*Com. Ang'l'r, without Augers.$2.25*
Without Augers.

| R. & E. Mfg. Co.: | Upright. | Angular. |
|---|---|---|
| Improved No. 3.. | $4.25 | No. 1..$5.00 |
| Improved No. 4.. | 3.75 | No. 2.. 3.38 |
| Improved No. 5.. | 2.75 | |
| Jennings' Nos. 1 and 4 | | .35&5% |
| Millers' Falls | | 5.75 |
| Snell's, Rice's Pat. | 2.50 | 2.75 |

### Corking—

Reisinger Invincible Hand Power....
℔ doz. $48.00

### Fence—

Williams' Fence Machines....each, $5.50

### Hoisting—

Moore's Anti-Friction Differential Pulley Block.....30%
Moore's Hand Hoist, with Lock Brake.....20%

### Ice Cutting—

Chandler's.....12½%

### Washing—

Boss Washing Machine Co.: Per doz.
Champion Rotary Banner No. 1..$54.00
Standard Champion No. 1.....$48.00
Standard Perfection.....$26.00
Cinti Square Western.....$30.00
Uneeda American, Round.....$29.00

### Mallets—

*Hickory*.....*45&5@50%*
*Lignumvitæ*.....*45&5@50%*
*Tinners' Hickory and Apple-wood*.....*doz. 45&5@50%*

### Mangers, Stable—

Swett Iron Works.....50%

### Mashers, Vegetable—

Western, W. G. Co., Potato....60&10%

### Mats, Door—

Elastic Steel (W. G. Co.).....10%

### Mattocks—

See *Picks and Mattocks.*

### Milk Cans—See *Cans, Milk.*

### Mills, Coffee, &c.—

Enterprise Mfg. Co.....25@30%
National list Jan. 1, 1902.....30%
Parker's Columbia & Victoria..50&10@60%
Parker's Box and Side.....50&10@60%
Swift, Lane Bros. Co.....30%

### Mowers, Lawn—

*NOTE.—Net prices are generally quoted*
*Cheap*.....*all sizes, $1.75@2.00*
*Good*.....*all sizes, $2.25@2.50*

| | *10* | *12* | *14* | *16-in.* |
|---|---|---|---|---|
| *High Grade* | *4.25* | *4.50* | *4.75* | *5.00* |

Continental.....60&5%
Great American.....70%
Great American Ball B'r'g, new list.70%
Quaker City.....70%
Pennsylvania.....60&5%
Pennsylvania, Jr., Ball Bearing....60%
Pennsylvania Golf.....50%
Pennsylvania Horse.....33⅓&5%
Pennsylvania Pony.....40&5%
Philadelphia:
Styles M., S., C., K., T.....70&5%
Style A. all Steel.....60&5%
Style E. High Wheel.....70&10&5%
Drexel and Gold Coin, special list.50%

### Nails—

*Wire Nails and Brads, Papered, List July 20, 1899*..*85&10&10@90%*
*Cut and Wire.* See *Trade Report.*
*Hungarian, Finishing, Upholsterers' &c.* See *Tacks.*

### Horse—

| Nos. | *6* | *7* | *8* | *9* | *10* | |
|---|---|---|---|---|---|---|
| Anchor | 23 | 21 | 20 | 19 | 18 | ...40&5% |
| Champlain | 28 | 26 | 25 | 24 | 23 | .....50% |
| Coleman | 13 | 12 | 12 | 11 | 11 | .....net |
| New Haven.. | 23 | 21 | 20 | 19 | 18 | ...40&5% |
| Putnam | 23 | 21 | 20 | 19 | 18 | ....33⅓% |
| New Putnam. | 19 | 18 | 17 | 16 | 16 | ..10&10% |
| Western | | | | | | .....℔ lb 8½¢ |

*Jobbers' Special Brands*.....
*per lb. 8½@10¢*

### Picture—

| *1¼* | *2* | *2½* | *3* | *3½ in.* |
|---|---|---|---|---|
| *Brass H'd.$5* | *.55* | *.60* | *.70* | *.. gro* |
| *Por. Head*... | *1.10* | *1.10* | *1.10* | *.. gro* |

### Nippers—

See *Pliers and Nippers.*

### Nuts—

*Cold Punched:* *Off list*
*Mfrs. or U. S. Standard.*
*Square, plain*.....*$5.10*
*Hexagon, plain*.....*$5.60*
*Square, C. T. & R.*.....*$5.30*
*Hexagon, C. T. & R.*.....*$6.00*
*Hot Pressed:*
*Mfrs., U. S. or Nar. Gauge Stan'd.*
*Square, Blank*.....*$5.60*
*Hexagon, Blank*.....*$6.00*
*Square, Tapped*.....*$5.60*
*Hexagon, Tapped*.....*$6.00*

### Oakum—

*Best or Government*.....*lb.* 6½¢
*Navy*.....*lb.* 5 ¢
*U. S. Navy*.....*lb.* 6 ¢
*Plumbers' Spun Oakum*.....2½¢
*In carload lots ¼¢ lb. off, f.o.b. New York.*

### Oil Tanks—See *Tanks, Oil.*

### Oilers—

*Brass and Copper*.....*50&10%*
*Tin or Steel*.....*65&10%*
*Zinc*.....*65&10%*
*Chase or Paragon:*
*Brass and Copper*...*45&10@50%*
*Tin or Steel*.....*65&10%*
*Zinc*.....*65&10%*
Malleable, Hammers' Imp'ed, No. 1, $3.60; No. 2, $4; No. 3, $4.40. ℔ doz. 20%
Malleable, Hammers' Old Pattern, same list.....50&10%
American Tube & Stamping Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, &c.....60@60&10%

### Openers— Can—

*French*.....*doz. 35¢*
*Iron Handle*.....*Per doz. 25@27¢*
*Sprague, Iron Handle*
*Per doz. 35@40¢*
*Sardine Scissors*...*doz. $1.75@$3.00*
National.....50%
Stowell's Sprague.....℔ doz. 35@45¢

### Egg—

Nickel Plate.....℔ doz., $2.00
Silver Plate.....℔ doz., $4.00

### Packing—

*Asbestos Packing, Wick and Rope*.....*lb. 14@16¢*

### Rubber—

*(Fair quality goods.)*

*Sheet, C. I*.....*8@10¢*
*Sheet, C. O. S*.....*9@13¢*
*Sheet, C. B. S*.....*10@14¢*
*Sheet, Pure Gum*.....*50@65¢*
*Sheet, Red*.....*40@50¢*
Jenkins' '96, ℔ lb 80¢.....25@25&5%

### Miscellaneous—

*American Packing*...*lb.* 7@10 ¢
*Cotton Packing*.....*lb.* 16@25 ¢
*Italian Packing*.....*lb.* 9@12½¢
*Jute*.....*lb.* 4@ 4½¢
*Russia Packing*.....*lb.* 8@11 ¢

### Pails, Creamery—

S. S. & Co., with gauges—No. 1, $6.25; No. 2, $6.50 ℔ doz.

### Pails, Water, Well, &c.—

See *Buckets.*

### Pans— Dripping—

*Standard List*....*60&10@60&10&5%*

### Fry—

*Common Lipped:*

| *Nos.* | *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|---|
| *Per doz.* | *$0.75* | *0.80* | *0.90* | *1.10* | *1.30* |

### Refrigerator, Galva.—

| *Inch* | *12* | *14* | *16* | *18* |
|---|---|---|---|---|
| *Per doz.* | *$1.95* | *2.25* | *2.80* | *3.15* |

### Roasting and Baking—

Regal, S., S. & Co., ℔ doz., Nos. 5, $4.50; 10, $5.25; 20, $5.75; 30, $6.25.
Savory, ℔ doz., net, Nos. 200, $9.00; 400, $15.00.
Simplex, ℔ gro.:

| No. 40 | 50 | 60 | 140 | 150 | 160 |
|---|---|---|---|---|---|
| $30.00 | 35.90 | 42.00 | 34.00 | 39.00 | 46.00 |

### Paper—Building Paper

*Asbestos:* *lb.*
*Building Felt*.....*2¾¢*
*Mill Board, sheet, 40x40 in.*..*3½¢*
*Mill Board, roll, thicker than 1-16 inch*.....*3½¢*
*Mill Board, 1-16 inch thick and less*.....*2½¢*
*Per roll*
*Rosin Sized Sheathing: 500 sq. ft. Light weight, 25 lbs. to roll*
*35@40¢*
*Medium weight, 30 lbs. to roll, 40@45¢*
*Heavy weight, 40 lbs. to roll..*
*$6@60¢*
*Black Water Proof Sheathing, 500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, $1.10; 4 ply, $1.25.*
*Deafening Felt, 9, 6 and 4½ sq. ft. to lb. ton*.....*$38.00@40.00*
*Red Rope Roofing, 250 sq. ft. per roll*.....*$1.75*

### Tarred Paper—

*1 ply (roll 300 sq. ft.), ton.... $32.50@35.50*
*2 ply, roll 108 sq. ft.....55@60c*
*3 ply, roll 108 sq. ft.....78@85¢*
*Slater's Felt (roll 500 sq. ft.) .75¢*
R. R. M. Stone Surfaced Roofing (roll 110 sq. ft.).....$2.75

### Sand and Emery—

*Flint Paper and Cloth .60@60&10%*
*Garnet Paper and Cloth....25%*
*Emery Paper and Cl'h .50&10@60%*

### Parers— Apple—

Advance .....℔ doz. $4.00
Baldwin .....℔ doz. $4.00
Bonanza Improved.....each $6.50
Daisy .....℔ doz. $4.00
Dandy .....each $7.50
Eureka Improved.....each $20.00
Family Bay State.....℔ doz. $15.00
Improved Bay State.....℔ doz. $36.00
Little Star.....℔ doz. $5.00
New Lightning.....℔ doz. $7.00
Reading 72.....℔ doz. $3.25
Reading 78.....℔ doz. $6.25
Rocking Table.....℔ doz. $6.20
Turn Table '98.....℔ doz. $6.00
White Mountain.....℔ doz. $5.00

### Potato—

Saratoga .....℔ doz. $7.00
White Mountain.....℔ doz. $6.00

### Picks and Mattocks—

*List Feb. 23, 1899..70&10@75&10%*

### Pinking Irons—

See *Irons, Pinking.*

### Pins, Escutcheon—

*Brass .....60@60&10%*
*Iron, list Nov. 11, '85..60@60&10%*

### Pipe, Cast Iron Soil—

*Standard, 2-6 in.....50&10%*
*Extra Heavy, 2-6 in.....65%*
*Fittings .....70%*

### Pipe, Merchant—

*Carload Lots.*

| | *Steel.* | | *Iron.* | |
|---|---|---|---|---|
| | *Blk.* | *Galv.* | *Blk.* | *Galv.* |
| *⅛ & ¼ in..* | *69%* | *53%* | *67 %* | *51 %* |
| *⅜ & ½ in..* | *73%* | *61%* | *71 %* | *59 %* |
| *¾ to 6 in..* | *77%* | *67%* | *75½%* | *65½%* |
| *7 to 12 in..* | *72%* | *57%* | *70½%* | *55 %* |

### Pipe, Sewer—

*Jobbers' Prices—*
*Standard Pipe and Fittings, 2 to 24 in.:*
*New England.....67%*
*New York and New Jersey.70%*
*Maryland, Delaware, E. Pa.72%*
*West. Pa. and West Va...73%*
*Virginia .....75%*
*Ohio, Michigan and Ky....75%*
*Indiana .....77%*
*NOTE.—Carload lots are generally delivered.*

### Pipe, Stove—

Edwards' Nested Stove Pipe:

| | C. L. | L. C. L. |
|---|---|---|
| 5 in., per 100 joints | $7.00 | $8.00 |
| 6 in., per 100 joints | 7.50 | 8.50 |
| 7 in., per 100 joints | 8.50 | 9.50 |

### Planes and Plane Irons—

#### Wood Planes—

*Bench, first qual.....40&10%*
*Bench, Second qual.....50&10%*
*Molding .....33⅓&10%*
Bailey's (Stanley R. & L. Co.)..... 5&10&25&10&10%
Chapin-Stephens Co.:
Bench, First Quality.....40@40&10%
Bench, Second Quality....50@50&10%
Molding .....33⅓@33⅓&10%
Toy and German.....40@40&10%
Chaplin's .....60%
Ohio Tool Co.:
Bench, First Quality.....40@40&10%
Bench, Second Quality....50@50&10%
Molding .....33⅓@33⅓&10%
Adjustable Wood Bottom.....60%
Union .....60%

#### Iron Planes—

Bailey's (Stanley R. & L. Co.)..... 25&10@25&10&10%
Chaplin's Iron Planes.....50&10%
Miscellaneous Planes (Stanley R. & L. Co.) .....20&10@20&10&10%
Ohio Tool Co.'s Iron Planes.....60%
Sargent's .....60&10%
Union .....60%

#### Plane Irons—

*Wood Bench Plane Irons..... 25&10@30%*
Buck Bros.....30%
Chapin-Stephens Co.....30@30&10%
Ohio Tool Co.....30%
Stanley R. & L. Co..20&10@20&10&10%
Union .....50%
L. & I. J. White.....20&5@25%

### Planters, Corn, Hand—

Kohler's Eclipse.....℔ doz. $8.50

### Plates—

*Felloe .....lb. 3¾@4¼¢*
Self-Sealing Pie Plates (S., S. & Co.). ℔ doz. $2.00.....50%

### Pliers and Nippers—

*Button Pliers.....75¢&10@80%*
*Gas Burner, per doz., 5 in., $1.25 @ $1.30; 6 in., $1.45 @ $1.50.*

| *Gas Pipe..* | *7* | *8* | *10* | *12-in.* |
|---|---|---|---|---|
| | *$2.00* | *$2.25* | *$3.00* | *$3.75* |

Acme Nippers.....50@50&5%
Cronk & Carrier Mfg. Co.:
American Button.....75&10%
Cronk's .....60%
Improved Button.....60&10%
Stub's Pattern.....50%
Combination and others.....33⅓%
Heller's Farriers' Nippers, Pincers and Tools.....40&10@40&10&10%
P., S. & W. Tinners' Cutting Nippers .....30@30&10%
Swedish Side, End and Diagonal Cutting Pliers.....50%
Utica Drop Forge & Tool Co.: Pliers and Nippers, all kinds.....40%

### Plumbs and Levels—

Chapin-Stephens Co.:
Plumbs and Levels.....30@30&10&10%
Chapin's Imp. Brass Cor.40@40&10&10%
Pocket Levels.....30@30&10&10%
Disston's Plumbs and Levels.....70%
Disston's Pocket Levels.....70%
C. E. Jennings & Co.'s Iron.....33⅓%
C. E. Jennings & Co.'s Iron, Adjustable .....40&7½%
Stanley R. & L. Co..30&10@30&10&10%
Stanley's Duplex.....20@20&10&10%
Woods' Extension.....33⅓%

### Poachers, Egg—

Buffalo Steam Egg Poachers, ℔ doz., No. 1, $6.00; No. 2, $9.00; No. 3, $9.60; No. 4, $12.00.....50%

### Points, Glaziers'—

*Bulk and 1-lb. papers....lb. 8 ¢*
*½-lb. papers.....lb. 8¾¢*
*¼-lb. papers.....lb. 9½¢*

### Pokes, Animal—

Ft. Madison Hawkeye.....℔ doz. $3.25
Ft. Madison Western.....℔ doz. $4.00

### Police Goods—

*Manufacturers' Lists..25@25&5%*
Tower's .....25%

### Polish—Metal—

Prestoline Liquid, No. 1 (½ pt.), ℔ doz., $3.00; No. 2 (1 qu.), $9.72....40%
Prestoline Paste.....40&10%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ℔ doz. 50¢; ℔ gro. $4.50; ½ lb boxes, ℔ doz. $1.25; 1 lb boxes, ℔ doz. $2.25.
U. S. Liquid, 8 oz. cans, ℔ doz., $1.25; ℔ gro., $12.00.
Barkeepers' Friend Metal Polish, ℔ doz., $1.75; ℔ gro., $18.00.
Wynn's White Silk, ½ pt. cans, ℔ doz. .....$2.00

### Stove—

Black Eagle Benzine Paste, 5 lb cans, ℔ lb 10¢
Black Eagle, Liquid, ½ pt. cans.. ℔ doz. 75¢
Black Jack Paste, ¾ lb cans, ℔ gr. $9.00
Black Kid Paste, 5 lb can....each, $0.65
Ladd's Black Beauty, gr. $10.00.....50%
Joseph Dixon's, ℔ gr. $5.75.....10%
Dixon's Plumbago.....℔ lb 8¢
Fireside .....℔ gr. $2.50
Gem, ℔ gr. $4.50.....10%
Japanese .....℔ gr. $3.50
Jet Black .....℔ gr. $3.50
Peerless Iron Enamel, 10 oz. cans.. ℔ doz. $1.50
Wynn's:
Black Silk, 5 lb pail.....each 70¢
Black Silk, ½ lb box.....℔ doz. $1.00
Black Silk, 5 oz. box.....℔ doz. $0.75
Black Silk, ½ pt. liq.....℔ doz. $1.00

### Poppers, Corn—

*1 qt., Square.....gro. $9.00*
*1 qt., Round.....gro. $10.00*
*1½ qt., Square.....gro. $11.00*
*2 qt., Square.....gro. $13.00*

### Post Hole and Tree Augers and Diggers—

See also *Diggers, Post Hole, &c.*

### Posts, Steel—

Steel Fence Posts, each, 5 ft., 42¢; 6 ft. 46¢; 6½ ft., 48¢.
Steel Hitching Posts.....each $1.30

### Potato Parers—

See *Parers, Potato.*

### Pots, Glue—

*Enameled .....40%*
*Tinned .....35%*

### Powder—

*In Canisters:*
*Duck, 1 lb.....each 45¢*
*Fine Sporting, 1 lb....each 75¢*
*Rifle, ½-lb.....each 15¢*
*Rifle, 1-lb.....each 25¢*
King's Semi-Smokeless:
Keg (25 lb bulk).....$6.50
Half Keg (12½ lb bulk).....$3.50
Quarter Keg (6¼ lb bulk).....$1.90
Case 24 (1 lb cans bulk).....$8.50
Half case (1 lb cans bulk).....$4.50

| King's Smokeless: | Shot Gun. | Rifle. |
|---|---|---|
| Keg (25 lb bulk) | $12.00 | $15.00 |
| Half Keg (12½ lb bulk) | 6.25 | 7.75 |
| Quarter Keg (6¼ lb bulk) | 3.25 | 4.00 |
| Case 24 (1 lb cans bulk) | 14.00 | 17.00 |
| Half case 12 (1 lb c. bk) | 7.25 | 8.75 |

Robin Hood Sm'less Shot Gun..50&20%

### Presses—

#### Fruit and Jelly—

Enterprise Mfg. Co.....20@25%

#### Seal Presses—

Morrill's No. 1, ℔ doz., $20.00.....50%

### Pruning Hooks and Shears

See *Shears.*

### Pullers, Cork—

Invincible Cork Puller.....$21.00.

### Pullers, Nail—

Cyclops .....50%
Miller's Falls, No. 3, ℔ doz., $12.00.. 33⅓&10%
Morrill's No. 1, Nail Puller, ℔ doz. $20.00 .....50%
Pearson No. 1, Cyclone Spike Puller, each $30.00.....50%
Pelican, ℔ doz. $9.00.....40&10%
Scranton, Case Lots:
No. 2B (large).....$5.50
No. 3B (small).....$5.00
Smith & Hemenway Co.:
Diamond B, No. 2, case lots..... ℔ doz. $6.00
Diamond B, No. 3, case lots..... ℔ doz. $5.50
Giant No. 1, ℔ doz. $18; No. 2, $16.50; No. 3, $15.....40%

### Pulleys, Single Wheel—

| *Inch* | *2* | *2½* | *3* |
|---|---|---|---|
| *Awning, doz.....* | *$0.55* | *.85* | *1.15* |

*Hay Fork, Swivel or Solid Eye. doz., 4 in., $1.05; 5 in., $1.35*

| *Inch* | *2* | *2¼* | *2½* |
|---|---|---|---|
| *Hot House, doz...* | *$0.70* | *.90* | *1.25* |
| *Inch* | *1¼* | *1½* | *1¾* | *2* |
| *Screw, doz....* | *$0.16* | *.19* | *.23* | *.30* |
| *Inch* | *1¾* | *2* | *2¼* | *2½* |
| *Side, doz.....* | *$0.30* | *.40* | *.55* | *.63* |
| *Inch* | *1½* | *1¾* | *2* | *2½* |
| *Tackle, doz....* | *$0.30* | *.42* | *.58* | *1.00* |

Stowell's:
Ceiling or End, Anti-Friction..60&10%
Dumb Waiter, Anti-Friction..60&10%
Electric Light.....60%
Side, Anti-Friction.....60&10%

### Sash Pulleys—

*Common Frame; Square or Round End, per doz, 1¾ and 2 in.....16@19¢*
*Auger Mortise, no Face Plate, per doz., 1¾ and 2 in..16@19¢*
Acme.....1¾ in., 16¢; 2 in., 19¢
Fox-All-Steel, Nos. 3 and 4, 2 in... ℔ doz. 50%
Grand Rapids All Steel Noiseless..50%
Ideal .....70&10%
Niagara.....1¾ in., 16¢; 2 in., 19¢
No. 26, Troy..1¾ in., 14½¢; 2 in., 16½¢
Star.....1¾ in., 16¢; 2 in., 19¢
Tackle Blocks—See Blocks.

### Pumps—

*Cistern .....60@60&10%*
*Pitcher Spout.....80@80&5%*
*Wood Pumps, Tubing, &c..45@50%*
Barnes Dbl. Acting (low list)..50&10%
Barnes' Pitcher Spout.....80%
Contractors' Rubber Diaphragm No. 2, B. & L. Block Co.....$16.00
Daisy Spray Pump.....℔ doz. $7.20
Flint & Walling's, Fast Mail Hand, (low list).....55%
Flint & Walling's Fast Mail (low list).....55&5%
Flint & Walling's Tight Top Pitcher.80%
National Specialty Mfg. Co., Measuring, $6.00.....30%
Mechanical Sprayer.....$7.20
Myers' Pumps (low list).....50%
Myers' Power Pumps.....50%
Myers' Spray Pumps.....50%

### Pump Leathers—

*Plunger and Lower Valve—Per gro.:*

| *Inch...* | *2* | *2¼* | *2½* | *2¾* |
|---|---|---|---|---|
| | *$2.20* | *2.50* | *2.75* | *3.00* |
| *Inch...* | *3* | *3¼* | *3½* | *3¾* | *4* |
| | *$3.30* | *3.60* | *3.85* | *4.10* | *4.40* |

*Plunger Cup Leathers—Per 100:*

| *Inch...* | *2½* | *3* | *3½* | *4* |
|---|---|---|---|---|
| | *$2.75* | *3.85* | *5.00* | *6.00* |

### Punches—

*Saddlers' or Drive, good..... doz. 50@75¢*
*Spring, single tube, good quality .....$1.75@2.00*
*Revolving (4 tubes)..... doz. $3.50@3.75*
Bemis & Call Co.'s Cast St'l Drive.50%
Bemis & Call Co.'s Check.....50%
Morrill's No. 1 (A.B.C.), ℔ doz. $15.50
No. 2, ℔ doz. $22.50.....50%
Hercules, each $7.50.....50%
Niagara Hollow Punches.....40%
Niagara Solid Punches.....55&10%
Steel Screw, B. & K. Mfg. Co.....50%
Tinners' Hollow, P., S. & W. Co.35@35&5%
Tinners' Solid, P., S. & W. Co., ℔ doz., $1.44.....60%

## Rail—Barn Door, &c.—

*Cast Iron Barn Door; Flange Screw Holes for Rd. Groove Wheels:*

| ½ | ⅝ | ¾ in. | |
|---|---|---|---|
| *$1.70* | *$2.10* | *$3.00* | *100 feet.* |

*Angular for Sq. Groove Wheels:*

| *Small.* | *Med.* | *Large.* | |
|---|---|---|---|
| *$1.50* | *$1.90* | *$2.60* | *100 feet.* |

*Sliding Door, Iron Painted..... 2½@2¾¢*
*Sliding Door, Wrought Brass, 1⅛ in., lb., 36¢.....30%*
Allith Mfg. Co.:
No. 1, Reliable Hgr. Track, ℔ ft. 5½¢
No. 2, Reliable Hgr. Track, ℔ ft. 7¢
Cronk's:
Double Braced Steel Rail....℔ ft. 3¢
O. N. T. Rail.....2¾¢
Griffin's:
xxx, ℔ 100 ft., 1 x 3-16 in., $3.00; 1¼ x 3-16 in., 3.50.
Hinged Hanger, ℔ 100 ft., 1 x 3-16 in., $3.10; 1¼ x 3-16 in., $3.60.
Lane's:
Hinged Track, ℔ 100 ft., 1 in., $3.70; 1¼ in., $4.40.
O. N. T., ℔ 100 ft., 1 in., $2.75; 1¼ in., $3.50; 1½ in., $4.00.
Standard, 1¼ in.....℔ 100 ft. $4.00
Lawrence Bros.:
℔ 100 ft. No. 201, $4.00; No. 202, $4.40.
New York, 1 x 3-16 in., ℔ 100 ft. $2.75
McKinney's:
Hinged Hanger Rail, ℔ ft., 11¢.....50%
None Better.....℔ ft. 3¾¢
Standard .....℔ ft. 4 ¢
Myers' Stayon Track.....60%
Richards' Mfg. Co.:
Common 1 x 3-16 in., $2.75; 1⅛ x 3-16, $3.25; 1¼ x 3-16, $3.50.
Special Hinged Hanger Rail.....$4.40
Fire Door Track, ℔ ft., 2½ x ⅛, 15¢; 3½ x ⅜, 9¢.
Lag Screw Rail, No. 65.....40%
Gauge Trolley Track, ℔ ft., No. 31. 10¢; No. 32, 15¢; No. 33, 24¢.
Safety Door Hanger Co.'s Storm King Safety.....60%
Safety Door Hanger Co.'s U. S. Standard .....60%
Stowell's:
Cast Rail.....℔ ft. 1¾¢
Steel Rail, Plain .....25%
Wrought Bracket, 1 3-16 in...℔ ft. 3¢
Wrought Bracket, 1½ x 5-16..℔ ft. 7¢
Swett's Hylo, ℔ ft. 11¢.....60%
P. L. B. Steel Rail.....℔ 100 ft. $3.00
No. 0, 1 x 3-16.....℔ 100 ft. $2.75

### Rakes—

*Net Prices, Malleable Rakes:*

| | *10* | *12* | *14 16-tooth* |
|---|---|---|---|
| *Shank* | *$1.50* | *1.60* | *1.75* | *1.85* |
| *Socket* | *$1.65* | *1.80* | *1.95* | *2.10* |

*Steel, Garden and Gravel, Aug. 1, '99, List.....70%*
*Malleable Iron, Garden...70&10%*
*Lawn Rakes, M't'l Head, per doz. 20 teeth.....$3.25@3.50*
*24 teeth.....$3.50@3.75*
Weldless Steel Garden.....75&5%
Fort Madison Red Head Lawn....$3.25
Fort Madison Blue Head Lawn....$2.70
Jackson Lawn, 29 and 30 teeth, ℔ doz., net.....$4.25
Kohler's:
Lawn Queen, 20-tooth.....℔ doz. $3.45
Lawn Queen, 24-tooth.....℔ doz. $3.60
Paragon, 20-tooth.....℔ doz. $2.75
Paragon, 24-tooth.....℔ doz. $3.00
Steel Garden, 14-tooth....℔ doz. $2.88
Malleable Garden, 14-tooth, ℔ doz. $1.75@2.00

### Rasps, Horse—

Disston's .....75%
Heller Bros.'.....70&5@70&10&5
McCaffrey's American St'd...60&10&5%
New Nicholson.....70&10@75%
See also Files.

### Razors—

Borasic .....60%
Fox Razors, No. 42...℔ doz. $20.00 } 40%
Fox Razors, No. 44..℔ doz. $20.00 } 40%
Fox Razors, No. 82, Platina... ℔ doz. $25.00 } 10s
Red Devil.....60%
Silberstein:
Carbo Magnetic.....$18.00
Griffon, No. 65.....$15.00
Griffon, No. 00.....$12.00
All other Razors.....40%

### Safety Razors—

Silberstein .....40%

### Reels, Fishing—

Hendryx:
M 6, Q 6, A 6, B 6, M 9¼, M 16, Q 16, A 16, B 16, 4008, Rubber, Populo, Nickeled Populo.....20%
Aluminum, German Silv., Bronze.25%
1240 N, 124 N.....20%
3004 N, 06 N, 6 RM, G 9.....25%
4 N, 6 PN, 24 N, 26 PN.....20%
2904 P.....33⅓%
2904 PN.....33⅓%
0924 N.....33⅓%
02084 N.....33⅓%
002904 PN.....33⅓%
802 N.....33⅓%
986 PN, 2904 N, 974 PN.....25%
5009 PN, 5009 N.....20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR.....20%
304 P, 304 PN, 00304 P, 00304 PN.33⅓%

### Registers—*List July 1, 1903.*

*Black Jap.....75%*
*Bronzed .....75%*

### Revolvers—

*Single Action.....85@90¢*
*Double Action, except 4½ cal.$1.90*
*Double Action, 4½ caliber....$2.05*
*Automatic .....$3.60*
*Hammerless .....$4.10*
*NOTE.—Jobbers frequently cut the above prices of manufacturers for small trade.*

### Riddles, Hardware Grade

*16 in.....per doz. $2.25@$2.50*
*17 in.....per doz. $2.50@$2.75*
*18 in.....per doz. $2.75@$3.00*

### Rings and Ringers—

#### Bull Rings—

| | *2* | *2½* | *3 inch.* |
|---|---|---|---|
| *Steel* | *$0.70* | *0.75* | *0.80 doz.* |
| *Copper* | *$1.00* | *1.15* | *1.40 doz.* |

Rea's Improved Self-Piercing, Copper, 2 in., ℔ doz., $1.25; 2½ in., $1.50; 3 in., $1.75.

#### Hog Rings and Ringers—

*Hill's Rings, gro. boxes, $4.00@4.25*
*Hill's Ringers, Gray Iron..... doz. 50@55¢*
*Hill's Ringers, Malleable Iron.. doz. 70@75¢*
*Blair's Rings...per gro. $4.75@5.00*
*Blair's Ringers.per doz. $0.60@ .65*
*Brown's Rings..per gro. $5.00@5.25*
*Brown's Ringers.per doz. $0.65@ .70*

### Rivets and Burrs—

*Copper .....50&10@10&60%*
*Iron or Steel.....75@75&5%*

### Rollers—

Acme, Stowell's Anti-Friction.....50%
Barn Door, Sargent's list.....60%
Cronk's Stay.....72¢
Cronk's Brinkerhoff.....90¢
Lane's Stay.....40%
Richards' Stay:
Handy Adj. and Reversible No. 53.50%
O. K. Adj. and Reversible No. 58.5½%
Lag Screw, Nos. 55 and 57.....50%
Fire Door, No. 59.....40%
Favorite, No. 54.....40%
Stowell's Barn Door Stay..℔ doz. $1.00
Swett's Anti-Friction.....50%
Screw and Spike Stay.....℔ doz. 65¢
Hinge Adjustable Stay.....℔ doz. 90¢

### Rope—

*Manila, 7-16 in. diam. and larger:*
*Mixed .....lb., 11@11½¢*
*Pure .....lb., 12½@12¾¢*
*Sisal, 7-16 in. diam. and larger:*
*Mixed .....lb., 8¾¢*
*Pure .....lb., 9¾@10¢*
*Sisal, Hay, Hide and Bale Ropes, Medium and Coarse:*
*Mixed .....lb., 8¼¢*
*Pure .....lb., 9¾@10¢*

*Sisal, Tarred, Medium Lath Yarn:*
*Mixed* ..... *lb., 8 ¢*
*Pure* ..... *lb., 9¼@9½¢*
*Cotton Rope:* *Lb.*
*Best, ¼-in. and larger* ..... *16½¢*
*Medium, ¼-in. and larger* ..... *14½¢*
*Common, ¼-in. and larger* ..... *10½¢*
*Jute Rope:*
*Thread No. 1, ¼-in. & up, lb.* *6½¢*
*Thread No. 2, ¼-in. & up, lb.* *5¾¢*
Old Colony Manila Transmission Rope ..... ℔ lb 17½ ¢

### Wire Rope—

*Galvanized* ..... *42½@2½%*
*Plain* ..... *50@2½%*

### Ropes, Hammocks—

Covert Mfg. Co.:
Jute ..... 50&5%
Sisal ..... 35&5%
Covert Saddlery Works ..... 60&5%

### Rules—

*Boxwood* ..... *60@10@10%*
*Ivory* ..... *35@10@35@10@5%*
Chapin-Stephens Co.:
Boxwood ..... 60@60&10%
Ivory ..... 35@35&10&10%
Miscellaneous ..... 50@50&10&10%
Combination ..... 55@55&10&10%
Stationers' ..... 10@10&10%
Keuffel & Esser Co.:
Folding, Wood ..... 35&10%
Folding, Steel ..... 33⅓&10%
Lufkin's Steel ..... 50&10%
Lufkin's Lumber ..... 60%
Stanley R. & L. Co.:
Boxwood ..... 60@60&10%
Ivory ..... 35@35&10&10%
Upson Nut Co.:
Boxwood ..... 60@60&10%
Ivory ..... 35&10@35&10&10%

### Sash Balances—

See *Balance, Sash.*

### Sash Locks—

See *Locks, Sash.*

### Sash Weights—

See *Weights, Sash.*

### Sausage Stuffers or Fillers

See *Stuffers or Fillers, Sausage.*

### Saw Frames—

See *Frames, Saw.*

### Saw Sets—See *Sets, Saw.*

### Saw Tools—See *Tools, Saw.*

### Saws—

Atkins':
Circular ..... 50%
Band ..... 50&10@60
Cross Cuts ..... 35&5
Mulay, Mill and Drag ..... 50
One-Man Saw ..... 40
Wood Saws ..... 40
Hand, Compass, &c. ..... 40%
Chapin-Stephens Co.:
Turning Saws and Frames ..... 30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws ..... 30&10&5%
Disston's:
Circular, Solid and Ins'ted Tooth. 50%
Band, 2 to 14 in. wide ..... 60
Band, ¼ to 1¾ ..... 60
Crosscuts ..... 50
Narrow Crosscuts ..... 55
Mulay, Mill and Drag ..... 50
Framed Woodsaws ..... 35
Woodsaw Blades ..... 35
Woodsaw Rods ..... 25%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 76, 77, 8 ..... 25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination ..... 30
Compass, Key Hole, &c. ..... 25
Butcher Saws and Blades ..... 35%
C. E. Jennings & Co.'s:
Back Saws ..... 25%
Butcher Saws ..... 30
Compass and Key Hole Saws. 35&5
Framed Wood Saws ..... 30
Hand Saws ..... 20&2½
Wood Saw Blades ..... 35%
Millers Falls:
Butcher Saws ..... 15&10%
Star Saw Blades ..... 15&10%
Peace & Richardson's Hand Saws. 30%
Simonds':
Circular Saws ..... 50%
Crescent Ground Cross Cut Saws. 35%
One-Man Cross Cuts ..... 40&10
Gang Mill, Mulay and Drag Saws. 50
Band Saws ..... 50
Back Saws ..... 25@25&7½
Butcher Saws ..... 35@35&7½
Hand Saws ..... 25@25&7½
Hand Saws, Bay State Brand ..... 45%
Compass, Key Hole, &c. 25@25&7½
Wood Saws ..... 35@35&7½
Springfield Mach. Screw Co.:
Diamond Kitchen Saws ..... 40&10@50
Butcher Saws Blades ..... 35@40
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws ..... 50%

### Hack Saws—

Atkins' Hack Saw Blades A A A. 25%
Disston's:
Concave Blades ..... 25%
Keystone ..... 40
Hack Saw Frames ..... 30%
Fitchburg File Works, The Best. 25%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180 ..... 40&7½%
Hack Saws, Nos. 175, 180, complete. 40&7½%
Goodell's Hack Saw Blades ..... 40%
Griffin's Hack Saw Frames. 35&5&10%
Griffin's Hack Saw Blades. 35&5&10%
Springfield Mach. Screw Co.:
Diamond Hack Saw Blades ..... 35%
Diamond Hack Saw Frames ..... 50%
Star Hack Saws and Blades ..... 15&10%
Sterling Hack Saw Blades ..... 35%
Sterling Hack Saw Frames. 30&10&5%

### Scroll—

Barnes' No. 7, $15 ..... 25%
Barnes' Scroll Saw Blades ..... 40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20 ..... 20%
Lester, complete, $10.00 ..... 15&10%
Rogers, complete, $4.00 ..... 15&10%

### Scalers, Fish—

Covert's Saddlery Works ..... 60&10%

### Scales—

*Family, Turnbull's* ..... *50@50&10%*
*Counter:*
*Hatch, Platform, ½ oz. to 4 lbs.* ..... *doz. $5.50*
*Two Platforms, ½ oz. to 8 lbs.* ..... *doz. $16.00*
*Union Platform, Plain* *$1.70@1.90*
*Union Platform, Stpd.* *$1.85@2.15*
Chatillon's:
Eureka ..... 25%
Favorite ..... 40%
Crocers' Trip Scales ..... 50%
Chicago Scale Co.:
The "Little Detective" ..... 25 lbs 50%
Union or Family No. 2 ..... 60
Portable Platform (reduced list). 50
Wagon or Stock (reduced list). 25@35
"The Standard" Portables ..... 50
"The Standard" R. R. and Wagon. 50%

### Scrapers—

*Box, 1 Handle* ..... *doz. $2.00@2.25*
*Box, 2 Handle* ..... *doz. $2.60@2.85*
*Ship* ..... *Light, $2.00; Heavy, $4.50*
Adjustable Box Scraper (S. R. & L. Co.), $6.00 ..... 30@30&10%
Chapin-Stephens Co., Box ..... 50@50&10%

### Screens, Window and Frames—

Flyer Pattern Screens. 60&5@60&5&2½%
Maine Screen Frames ..... 40&10&5
Perfection Screens ..... 60&5@60&5&2½
Phillips' Screen Frames. 60&5@60&5&2½%
See also *Doors.*

### Screws—Bench and Hand

*Bench, Iron, doz., 1 in., $2.50@2.75; 1½, $3.00@3.25; 1¼, $3.50@3.75*
*Bench, W'd, Beech. doz.* *30@30&5%*
*Hand, Wood* ..... *30@30&5%*
R. Bliss Mfg. Co., Hand ..... 30@30&10%
Chapin-Stephens Co., Hand. 30@30&10%
Ohio Tool Co., Bench and Hand. 30%

### Coach, Lag and Hand Rail—

*Lag, Cone Point, list Oct. 1, '99* ..... *80@5%*
*Coach, Gimlet Point, list Oct. 1, '99* ..... *80%*
*Hand Rail, list Jan. 1, '81* ..... *70&10@75%*

### Jack Screws—

*Standard List* ..... *75@10@80@5%*
Millers Falls ..... 50&10&10%
Millers Falls, Roller ..... 50&10%
P., S. & W. ..... 50@50&5%
Sargent ..... 70&10%
Swett Iron Works ..... 75&10@80&5%

### Machine—

*List Jan. 1, '98:*
*Flat or Round Head, Iron* ..... *50@50&10%*
*Flat or Round Head, Brass* ..... *50@50&10%*

### Set and Cap—

*Set (Iron or Steel)* *80@80&10&10%*
*Sq. Hd. Cap* ..... *75@75&10%*
*Hex. Hd. Cap* ..... *75@75&10%*
*Rd. or Fillister Hd. Cap* ..... *65@65&10%*

### Wood—

*List July 23, 1903.*
*Manufacturers' printed discounts:*
*Flat Head, Iron* ..... *87½&10@..%*
*Round Head, Iron* ..... *85 &10@..%*
*Flat Head, Brass* ..... *85 &10@..%*
*Round Head, Brass* ..... *80 &10@..%*
*Flat Head, Bronze* ..... *77½&10@..%*
*Round Head, Bronze* ..... *75 &10@..%*
*Drive Screws* ..... *87½&10%*

### Scroll Saws—

See *Saws, Scroll.*

### Scythes—

*Per doz.*
*Prices announced for next season:*
*Clipper Pattern, Grass* ..... *$6.20*
*Full Polished, Clipper* ..... *$6.75*
*Grain* ..... *$8.00*
*Clipper, Grain* ..... *$8.25*
*Weed and Bush* ..... *$6.25*

### Seeders, Raisin—

Enterprise ..... 25@30%

### Sets—Awl and Tool—

*Brad Awl and Tool Sets:*
*Wood Handle, 10 Awls* ..... *doz. $2.00@2.25*
*Wood Handle, 14 Awls, 6 Tools* ..... *doz. $2.50@2.60*
Aiken's Sets, Awl and Tools:
No. 20, ℔ doz. $10.00 ..... 50&10&10%
Fray's Adj. Tool Handles, Nos. 1, $12; 2, $18; 3, $12; 4, $9; 5, $7 ..... 50%
C. E. Jennings & Co.'s Model Tool Holders ..... 30%
Millers Falls Adj. Tool Handles, No. 1, $12; No. 4, $12; No. 5, $18. 15&10%
Stanley's Excelsior:
No. 1, $7.50; No. 2, $4.00; No. 3, $5.50 ..... 30@30&10&10%

### Garden Tool Sets—

Ft. Madison Three Plows, Hoe, Rake and Shovel ..... ℔ doz sets $9.00

### Nail—

*Square* ..... *per gro. $2.25@2.50*
*Round, Blk. and Pol., assorted.* *gro. $1.80@2.00*
*Octagon* ..... *gro. $3.50@3.75*
Buck Bros. ..... 27½%
Cannon's Diamond Point, ℔ gro. $12. 25%
Mayhew's ..... ℔ gro. $9.00
Snell's Cannon's Diamond Point ..... ℔ gro. $7.20
Snell's Corgated, Cup Pt. ℔ gro. $7.20
Snell's Knurled, Cup Pt. ℔ gro. $7.20
Springfield Mach. Screw Co.: Diamond Knurled Cup Pt. ℔ gro. $7.50

### Rivet—

*Regular list* ..... *75@75&10%*

### Saw—

Aiken's:
Genuine ..... 50&10%
Imitation ..... 50&10%
Atkin's:
Criterion ..... 40%
Adjustable ..... 40%
Bemis & Call Co.'s:
Cross Cut ..... 30%
Plate ..... 20%
Disston's Star and Monarch ..... 25%
Morrill's No. 1, $15.00 ..... 50%
Nos. 3 and 4, Cross Cut, $20.63 ..... 50%
No. 5, Mill, $30.00 ..... 50%
Nos. 10, 11, 95, $15.63 ..... 50%
No. 1 Old Style, $10.00 ..... 50%
Special, $16.25 ..... 50%
Giant Royal, Cross Cut ..... ℔ doz. $8.50
Royal, Hand ..... ℔ doz. $5.00
Taintor Positive ..... ℔ doz. $6.75

### Shaving—

Fox Shaving Sets, No. 30 ..... ℔ doz., net, $24.00

### Sharpeners, Knife—

Chicago Wheel & Mfg. Co. ..... 65%

### Shaves, Spoke—

*Iron* ..... *doz. $1.00@1.15*
*Wood* ..... *doz. $1.75@2.00*
Bailey's (Stanley R. & L. Co.) ..... 30@30&10&10%
Chapin-Stephens Co. ..... 30@30&10&10%
Goodell's, ℔ doz. $9.00 ..... 15&10%
Wood's F1 and F2 ..... 50%

### Shears—

| *Cast Iron* .. | 7 | 8 | 9 in. |
|---|---|---|---|
| *Best* .... | *$16.00* | *18.00* | *20.00 gro.* |
| *Good* .... | *$13.00* | *15.00* | *17.00 gro.* |
| *Cheap* .. | *$5.00* | *6.00* | *7.00 gro.* |

*Straight Trimmers, &c.:*
*Best quality, Jap* ..... *70@70&10%*
*Best quality, Nickel* ..... *60@60&10%*
*Fair quality, Jap* ..... *80@80&5%*
*Fair quality, Nickel* ..... *75@75&10%*
*Tailors' Shears* ..... *40@40&10%*
Acme Cast Shears ..... 40@40&5
Heinisch's Tailor's Shears ..... 10
Wilkinson's Hedge, 1900 list ..... 45%
Wilkinson's Branch, Lawn & Border. 40
Wilkinson's Sheep, 1900 list ..... 50%

### Tinners' Snips—

*Steel Blades* ..... *20@5@20@10%*
*Steel Laid Blades* ..... *40@10@50%*
Forged Handles, Steel Blades, Berlin ..... 40@40&10
Heinisch's Snips ..... 10%
Jennings & Griffin Mfg. Co.'s, 6½ to 10 in. ..... 50%
Niagara Snips ..... 40%
P., S. & W. Co. ..... 20%

### Pruning Shears and Tools

Cronk's Grape Shears ..... 33⅓%
Cronk's Pruning Shears ..... 33⅓
Disston's Combined Pruning Hook and Saw, ℔ doz. $18.00 ..... 25%
Disston's Pruning Hook, ℔ doz. $12.00 ..... 25%
John T. Henry Mfg. Co.:
Pruning Shears, all grades. 40@40&5%
Orange Shears ..... 50&10@20&20
Grape ..... 40&10@50
Tree Pruners ..... 75
P., S. & W. Co. ..... 33⅓%

### Sheaves—Sliding Door—

Stowell's Anti-Friction ..... 50%
Patent Roller, Hatfield's, Sargent's list ..... 70&10%
Reading ..... 60%
R. & E. list ..... 33⅓%
Wrightsville Hatfield Pattern ..... 80%

### Sliding Shutter—

Reading list ..... 45&20%
R. & E. list ..... 33⅓%
Sargent's list ..... 50&10%

### Shells—Shells, Empty—

Brass Shells, Empty:
First quality, all gauges ..... 60&5%
Climax, Club, Rival, 10 and 12 gauge ..... 65&5%
Paper Shells, Empty:
Acme, Ideal, Leader, New Rapid, Magic, 10, 12, 16 and 20 gauge. 25&5%
Blue Rival, New Climax, Challenge, Monarch, Defiance, Repeater, Yellow Rival, 10, 12, 16 and 20 gauge. 20%
Climax, Union, League, New Rival, 10 and 12 gauge ..... 25%
Climax, Union, League, New Rival, 14, 16 and 20 gauge ($7.50 list). 20%
Expert, Metal Lined and Pigeon, 10, 12, 16 and 20 gauge ..... 33⅓&5%
Robin Hood, Low Brass ..... 20&10%
Robin Hood, High Brass ..... 30&10%

### Shells, Loaded—

*Loaded with Black Powder* ..... *40%*
*Loaded with Smokeless Powder, medium grade* ..... *40&5%*
*Loaded with Smokeless Powder, high grade* ..... *40&10&10%*
Robin Hood Smokeless Powder:
Robin Hood, Low Brass ..... 50%
Comets, High Brass ..... 50&10&5%

### Shoes, Horse, Mule, &c.—

*F.o.b. Pittsburgh:*
*Iron* ..... per keg *$4.00*
*Steel* ..... per keg *$3.75*
Burden's, all sizes ..... ℔ keg $3.90

### Shot—

*Drop, up to B, 25-lb. bag* ..... *$1.65*
*Drop, B and larger* ..... *per 25-lb. bag, $1.90*
*Buck, 25-lb. bag* ..... *$1.90*
*Chilled, 25-lb. bag* ..... *$1.90*

### Shovels and Spades—

*Association List, Nov. 15, 1902.* *40%*

### Sieves and Sifters—

*Hunter's Imitation* ..... *gro. $10.50@11.00*
*Hunter's Genuine* ..... *per gro. $12.00@12.50*
Buffalo Metallic Blued, S. S. Co., ℔ gr.:

| 14&16 | 16&18 | 18&20 |
|---|---|---|
| $13.20 | $13.50 | $14.40 |

Shaker (Barler's Pat.) Flour Sifters, ℔ doz., $2.00 ..... 20%

### Sieves, Seamless Metallic

| | —Per dozen.— | | | |
|---|---|---|---|---|
| *Mesh* ..... | *14* | *16* | *18* | *20* |
| *Iron Wire* .. | *$1.05* | *1.05* | *1.10* | *1.20* |
| *Tinned Wire* .. | *$1.15* | *1.15* | *1.20* | *1.30* |

### Sieves, Wooden Rim—

*Nested, 10, 11 and 12 Inch.*
*Mesh 18, Nested* ..... *doz. $0.90@0.95*
*Mesh 20, Nested* ..... *doz. $1.00@1.05*
*Mesh 24, Nested* ..... *doz. $1.30@1.40*

### Sinks, Cast Iron—

*Standard list* ..... *60@60&10%*
*NOTE.—There is not entire uniformity in lists used by jobbers.*

### Skeins, Wagon—

*Cast Iron* ..... *80&10@80&10&10%*
*Steel* ..... *40@40&10%*

### Slates, School—

*Factory Shipments.*
*"D" Slates* ..... *50@50&10%*
*Eureka, Unexcelled Noiseless* .. *60&5 tens*
*Victor A, Noiseless* ..... *60&5 tens &5%*

### Slaw Cutters—See *Cutters.*

### Snaps, Harness—

*German ?* ..... *40@40&10%*
Covert Mfg. Co.:
Derby ..... 30&5&2%
High Grade ..... 45
Jockey ..... 30&10
Trojan ..... 45
Yankee ..... 30&5&2
Yankee, Roller ..... 30&5&2%
Covert's Saddlery Works:
Crown ..... 60%
German ..... 60
Model ..... 60
Triumph ..... 60%
Oneida Community:
Solid Swivel ..... 60%
Sargent's Patent Guarded. 66⅔&10%

### Snaths—

*Scythe* ..... *50%*

### Snips, Tinners—See *Shears.*

### Spoons and Forks—Silver Plated—

*Good Quality* ..... *50&10@60&5%*
*Cheap* ..... *60@60&10%*
International Silver Co.:
1847 Rogers Bros. and Rogers & Hamilton ..... 40&10%
Rogers & Bro., William Rogers' Eagle Brand ..... 50&10%
Anchor, Rogers Brand ..... 60
Wm. Rogers & Son ..... 60&10%

### Miscellaneous—

*German Silver* ..... *60@60&5%*
Cattaraugus Cutlery Co.:
Seneca Silver ..... 50%

### Tinned Iron—

*Teas* ..... *per gro. $5@$50¢*
*Tables* ..... *per gro. $0.90@$1.00*

### Springs—Door—

Chicago (Coil) ..... 40&10%
Gem (Coil) ..... 20
Pullman (Coil) ..... 20
Reliance (Coil) ..... 40&10%
Star (Coil) ..... 30
Torrey's Rod, 39 in. ..... ℔ doz. $1.10
Victor (Coil) ..... 50&10&10%

### Carriage, Wagon, &c.—

| *1¼ in. and Wider:* | *Per lb* |
|---|---|
| *Black* | *14@14¢* |
| *Half Bright* | *14@14¢* |
| *Bright* | *14½@14¾¢* |

*Painted Seat Springs:*
*1½ x 2 x 26* ..... *per pr. 42¢*
*1½ x 3 x 28* ..... *per pr. 70¢*

### Sprinklers, Lawn—

Enterprise ..... 25@30%
Philadelphia No. 1, ℔ doz. $12; No. 2, $15; No. 3, $24 ..... 30%

### Squares—

*Nickel plated* .. } *List Jan. 5, 1900.*
*Steel and Iron* .. } *75@75&5%*
*Rosewood Hdl. Try Square and T-Bevels* ..... *60&10&10@70%*
*Iron Hdl. Try Squares and T-Bevels* ..... *40&10@40&10&10%*
Disston's Try Sq. and T-Bevels. 70%
Winterbottom's Try and Miter ..... 40&10@40&10&10%

### Squeezers, Lemon

*Wood, Common, gro., No. 0, $5.25@$5.50; No. 1, $6.25@$6.50.*
*Wood, Porcelain Lined:*
*Cheap* ..... *doz. $1.00*
*Good Grade* ..... *doz. $1.25*
*Tinned Iron* ..... *doz. $0.75@1.25*
*Iron, Porcelain Lined* ..... *doz. $1.75*

### Staples—

*Barbed Blind* ..... *lb. 6@6½¢*
*Electricians', Association list* .. *80&10&10&10%*
*Fence Staples, Plain, $2.25; Galvanized* ..... *$2.55*
*Poultry Netting Staples* ..... *per lb. 3¼@3½¢*
Grand Crossing Tack Co.'s list. 80&10%

### Steels, Butchers'—

Dick's ..... 30%
Foster Bros. ..... 30%
C. & A. Hoffmann's ..... 40%

### Steelyards — ..... 30@30&10%

### Stocks and Dies—

*Blacksmiths'* ..... *50@50&10%*
Curtis Rev'ble Ratchet Die Stock. 25%
Derby Screw Plates ..... 25%
Gardner Die Stocks No. 1 ..... 50%
Gardner Die Stocks, larger sizes. 40%
Green River ..... 25%
Lightning Screw Plate ..... 25%
Little Giant ..... 25%
Reece's New Screw Plates ..... 25%

### Stone—Scythe Stones—

Chicago Wheel & Mfg. Co.:
Gem Corundum, 10 in., $2.50 ℔ gro., 12 in., $10.80.
Norton Emery Scythe Stones:
Less than gross lots ..... ℔ gro. $9.00
One gross or more ..... ℔ gro. $7.20
Lots of 10 gross or more. ℔ gro. $6.00

Pike Mfg. Co., 1901 list:
Black Diamond S. S., ℔ gro. $12.00
Lamoille S. S., ℔ gro. $11.00
White Mountain S. S., ℔ gro. $9.00
Green Mountain S. S., ℔ gro. $6.00
Extra Indian Pond S. S., ℔ gro. $7.50
No. 1 Indian Pond S. S., ℔ gro. $7.00
No. 2 Indian Pond S. S., ℔ gro. $4.50
Leader Red End S. S., ℔ gro. $4.50
Emery and Corundum, 10 in., ℔ gro. $9.00
Pure Corundum, 10 in., ℔ gro. $12
Crescent ..... $7.00
Emery Scythe Rifles, 2 Coat, $8
Emery Scythe Rifles, 3 Coat, $10
Emery Scythe Rifles, 4 Coat, $12
Balance of 1904 list 33⅓% — 33⅓%

## Oil Stones, &c.—

Chicago Wheel & Mfg. Co., 1901 list:
Gem Corundum Oil, Double Grit. 50%
Gem Corundum Axe, Single or Double Grit ..... 55%
Gem Corundum Slips ..... 55%
Gem Corundum Razor Hones ..... 50%
Pike Mfg. Co., 1901 list: ℔ lb.
Arkansas St. No. 1, 3 to 5½ in. $2.80
Arkansas St. No. 1, 5½ to 8 in. $3.50
Arkansas Slips No. 1 ..... $4.00
Lily White Washita, 4 to 8 in. 60¢
Rosy Red Washita, 4 to 8 in. 60¢
Washita St., Extra, 4 to 8 in. 50¢
Washita St., No. 1, 4 to 8 in. 40¢
Washita St., No. 2, 4 to 8 in. 30¢
Lily White Slips ..... 90¢
Rosy Red Slips ..... 90¢
Washita Slips, Extra ..... 80¢
Washita Slips, No. 1 ..... 70¢
Washita Slips, No. 2 ..... 40¢ — 33⅓%
India Oil Stones (entire list) ..... 33⅓%
Quickcut Emery and Corundum Oil Stone, Double Grit ..... 33⅓%
Quickcut Emery and Corundum Axe Stone, Double Grit ..... 33⅓%
Quickcut Emery Rubbing Bricks. 33⅓%
Hindostan No. 1, R'g'lar. ℔ lb 8¢
Hindostan No. 1, Small .. ℔ lb 10¢
Axe Stones (all kinds) .....
Turkey Oil Stones, Extra, 5 to 8 in. ..... ℔ lb 80¢
Queer Creek Stones, 4 to 8 in. 20¢
Queer Creek Slips ..... 40¢
Sand Stone ..... 6¢ — 33⅓%
Belgian, German and Swaty Razor Hones ..... 50%
Natural Grit Carving Knife Hones ..... ℔ doz. $3.00
Quick Edge Pocket Knife Hones ..... ℔ doz. $2.50
Mounted Kitchen Sand Stone, ℔ doz. $1.50 — 10%

## Stoners, Cherry—

Enterprise ..... 25@30%

## Stoppers, Bottle—

Victor Bottle Stoppers ..... ℔ gro. $9.00

## Stops—Bench—

Millers Falls ..... 15&10%
Morrill's, ℔ doz., No. 1, $10.00 ..... 50%
Morrill's, No. 2, $12.50 ..... 50%

## Door—

Chapin-Stephens Co. ..... 60@60&10%

## Plane—

Chapin-Stephens Co. ..... 20%

## Straps—Box—

Cary's Universal, case lots .. 20&10&10%

## Hame—

Covert's Saddlery Works ..... 60&10%

## Stretchers, Carpet—

*Cast Iron, St'l Points. doz. 55@60%*
*Socket ..... doz. $1.75*
Excelsior Stretcher and Tack Hammer Combined, ℔ doz. $6.00 ..... 20%

## Stuffers, Sausage—

Enterprise Mfg. Co. ..... 25@25&7½%
National Specialty Co., list Jan. 1, 1902 ..... 30&5%

## Sweepers, Carpet—

National Sweeper Co.: ℔ doz.
Auditorium, Roller Bearing (26 in. case), Nickel ..... $54.00
Mammoth, Roller Bearing (30 in. case), Nickel ..... $60.00
Marion, Roller Bearing, regular finishes, full Nickel ..... $24.00
Marion Queen, Roller Bearing, full Nickel ..... $24.00
Monarch, Roller Bearing, N'kel. $22.00
Monarch, Roller B'r'g, Jap'ned. $20.00
Transparent, Roller Bearing, Plate Glass Top, Nickel ..... $36.00
Monarch Extra, Roller Bearing, (17-in. case), Nickel ..... $36.00
Monarch Extra, Roller Bearing (17-in. case), Japanned ..... $33.00
National Queen, Fancy Veneers. $27.00
Perpetual, Regular B'r'gs, Nkl. $20.00
Perpetual, Regular B'r'gs, Jap. $18.00

*NOTE.—Rebates: 50¢ per dozen on three-dozen lots; $1 per dozen on five-dozen lots; $2 per dozen on ten-dozen lots; $2.50 per dozen on twenty-five-dozen lots*

# Tacks, Brads, &c.—

*List Jan. 15, '99.*

*Carpet Tacks ..... 90¢&30¢&10¢ .. %*
*American Cut Tacks .. 90¢&25¢ .. %*
*Swedes Cut Tacks. 90¢&30¢&10¢&5¢ .. %*
*Swedes Upholsterers' Tacks .... 90¢&45¢&10¢&5¢ .. %*
*Gimp Tacks ..... 90¢&45¢&10¢ .. %*
*Lace Tacks ..... 90¢&45¢&10¢ .. %*
*Trimmers' Tacks. 90¢&30¢&10¢&5¢ .. %*
*Looking Glass Tacks. 70¢&10¢&5¢ .. %*
*Bill Posters' and Railroad Tacks ..... 90¢&45¢&10¢ .. %*
*Hungarian Nails .... 80¢&30¢&5¢ .. %*
*Common and Patent Brads .... 80¢&10¢&5¢ .. %*
*Trunk and Clout Nails. 80¢&10¢ .. %*

*NOTE.—The above prices are for Straight Weights.* An extra 5% is given on Star Weights** and an extra 10¢&5% on Standard Weights.****

## Miscellaneous—

*Double Pointed Tacks ..... 90¢&6 or 7 ten*
Steel Wire Brads, R. & E. Mfg. Co.'s list ..... 50&10@60%
See also Nails, Wire.

## Tanks, Oil—

| | Each. |
|---|---|
| Emerald, S., S. & Co. ..... 30-gal. | $3.40 |
| Emerald, S., S. & Co. ..... 60-gal. | $4.25 |
| Queen City, S., S. & Co. ..... 30-gal. | $3.65 |
| Queen City, S., S. & Co. ..... 60-gal. | $4.50 |

## Tapes, Measuring—

*American Asses' Skin .. 40¢&10@50%*
*Patent Leather ..... 25@30&5%*
*Steel ..... 40@40&10%*
*Chesterman's ..... 25@25&5%*
Eddy Asses' Skin ..... 40&10@50%
Eddy Patent Leather ..... 25@30&5%
Eddy Steel ..... 40@40&10%
Keuffel & Esser Co.:
Favorite, Ass Skin ..... 40&10@50%
Favorite, Duck and Leather ..... 25&5@25&10%
Metallic and Steel, lower list ..... 35@35&5%
Pocket ..... 35@35&5%
Lufkin's:
Asses' Skin ..... 40&10@50%
Metallic ..... 30@30&5%
Patent Bend, Leather .... 25&5@25&10%
Pocket ..... 40@40&5%
Steel ..... 33⅓@35%

## Teeth, Harrow—

*Steel Harrow Teeth, plain or headed, ⅝-inch and larger ... per 100 lbs. $3.00*

## Thermometers—

*Tin Case ..... 80¢&10@80¢&10&5%*

## Ties, Bale—Steel Wire—

*Single Loop ..... 80¢&2½%*
*Monitor, Cross Head, &c .... 70%*

## Brick Ties—

Niagara Brick Ties ..... 25&10%

## Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

## Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

## Tips, Safety Pole—

Covert's Saddlery Works ..... 60&10%

## Tire Benders, Upsetters, &c.

See *Benders and Upsetters, Tire.*

## Tools—Coopers'—

L. & I. J. White ..... 20@20&5%

## Hay—

Myers' Hay Tools ..... 50%
Stowell's Hay Carriers ..... 50%
Stowell's Hay Forks ..... 50%
Stowell's Fork Pulleys ..... 50%

## Saw—

Atkins' Cross Cut Saw Tools ..... 40%
Simonds' Improved ..... 33⅓%
Simonds' Crescent ..... 25%

## Ship—

L. & I. J. White ..... 25%

## Transom Lifters—

See *Lifters, Transom.*

## Traps—Fly—

*Balloon, Globe or Acme, doz. $1.15@$1.25; gro .... $11.50@12.00*
*Harper, Champion or Paragon, doz. $1.25@1.40; gro. $13.00@13.50*

## Game—

*Oneida Pattern .. 75¢&10@75¢&10¢&5%*
Newhouse ..... 45@45&5%
Hawley & Norton ..... 65%
Victor and Oneida ..... 70&10@70&10&5%
O. C. Jump (Blake Pat.) .. 60&5@60&10%

## Mouse and Rat—

*Mouse, Wood, Choker, doz. holes ..... 8½@9¢*
*Mouse, Round or Square Wire, doz. 85@90¢*
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, each $1.21; ℔ doz. $13.25
No. 3, Rat, ℔ doz. $6.50; case of 50 $5.75 doz.
No. 3½, Rat, ℔ doz. $5.25; case of 72 ℔ gro. $4.70 doz.
No. 4, Mouse, ℔ doz. $3.85; case of 150 $3.00 doz.
No. 5, Mouse, ℔ doz. $3.00; case of 150 $2.25 doz.

## Trimmers, Spoke—

Wood's E I ..... 50%

## Trowels—

Disston Brick and Pointing ..... 30%
Disston Plastering ..... 25%
Disston "Standard Brand" and Garden Trowels ..... 35%
Kohler's Steel Garden Trowels, 5 in. ℔ gro. $1.80
Kohler's Steel Garden Trowels, 6 in. ℔ gro. $6.00
Never-Break Steel Garden Trowels .. ℔ gro. $6.00 .. 25&5%
Rose Brick and Plastering ..... 25&5%
Woodrough & McParlin, Plastering. 25%

## Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern ..... 50&10%
Western Pattern ..... 60&10%
Handy Trucks ..... ℔ doz. $16.00
Grocery ..... ℔ doz. $15.00
Daisy Stove Trucks, Improved Pattern ..... ℔ doz. $18.50
McKinney Trucks ..... each $10.00
Model Stove Trucks ..... ℔ doz. $18.50

## Tubs, Wash—

| | No. 1 | 2 | 3 |
|---|---|---|---|
| *Galvanized, per doz.* | $4.75 | 5.25 | 6.00 |

Galvanized Wash Tubs (S., S. & Co.):

| No. | 1 | 2 | 3 | 10 | 20 | 30 |
|---|---|---|---|---|---|---|
| Per doz., net. | $5.70 | 6.30 | 7.20 | 6.60 | 7.20 | 8.10 |

## Twine, Miscellaneous—

| *Flax Twine:* | BC. | B. |
|---|---|---|
| *No. 9, ¼ and ½-lb. Balls.* | 22@24¢ | |
| *No. 12, ¼ and ½-lb. Balls.* | 18@20¢ | |
| *No. 18, ¼ and ½-lb. Balls.* | 16@18¢ | |
| *No. 24, ¼ and ½-lb. Balls.* | 16@18¢ | |
| *No. 36, ¼ and ½-lb. Balls.* | 15@17¢ | |
| *Chalk Line, Cotton ½-lb. Balls* | 30¢ | |
| *Cotton Mops, 6, 9, 12 and 15 lb. to doz* | 9½@11¢ | |
| *Cotton Wrapping, 5 Balls to lb., according to quality* | 13½@20¢ | |
| *American 2-Ply Hemp, ¼ and ½-lb. Balls* | 13@14¢ | |
| *American 3-Ply Hemp, 1-lb. Balls* | 13@14¢ | |
| *India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine)* | 8¢ | |
| *India 3-Ply Hemp, 1-lb. Balls.* | 7@8¢ | |
| *India 3-Ply Hemp, 1½-lb. Balls.* | 6@7¢ | |
| *2, 3, 4 and 5-Ply Jute, ½-lb. Balls* | 9@10¢ | |
| *Mason Line, Linen, ½-lb. Bls.* | 46¢ | |
| *No. 26½ Mattress, ¼ and ½-lb. Balls* | 37¢ | |
| *Wool, 3 to 6 ply .... B 4¾@; A 5¢* | | |

# Vises—

*Solid Box ..... 60&5@60&10&5%*

## Parallel—

Athol Machine Co.: 40%
Simpson's Adjustable ..... 40%
Standard ..... 40%
Amateur ..... 25%
Columbian Hdw. Co. ..... 40%
Emmert Universal:
Pattern Makers' No. 1, $15.00; No. 2, $12.50; No. 3, $10.00.
Machinist and Tool Makers' No. 4, $12.50; No. 5, $7.00; No. 6, $10.00; No. 10, $21.50.
Jewelers' No. 7 ..... $4.00
Fisher & Norris Double Screw .. 15&10%
Hollands':
Machinists' ..... 40@40&5%
Keystone ..... 65&5@70%
Lewis Tool Co. ..... 20@30%
Merrill's ..... 20%
Millers Falls ..... 60&10%
Massey Vise Co.:
Clincher ..... 40%
Perfect ..... 20%
Lightning Grip ..... 20%
Parker's:
Victor ..... 20@25%
Regulars ..... 20@25%
Vulcan's ..... 40@45%
Combination Pipe ..... 55@60%
Prentiss ..... 20@25%
Sargent's ..... 40%
Smith & Hemenway Co.:
Machinists' ..... 40%
Jewelers' ..... 33⅓%
Snediker's X. L. ..... 33⅓%
Stephens' ..... 33⅓%

## Saw Filers—

Disston's D 3 Clamp and Guide, ℔ doz. $30 ..... 25%
Perfection Saw Clamps, ℔ doz. .... $5.00
Reading ..... 60%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3 ..... 45&50%

## Wood Workers—

Massey Vise Co.:
Lightning Grip ..... 15%
Perfect ..... 15%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

## Miscellaneous—

Bignall & Keeler Combination Pipe Vise ..... 60&10%
Holland's Combination Pipe .. 60@60&5%
Massey's Quick Action Pipe ..... 40%
Parker's Combination Pipe:
87 Series ..... 60%
187 Series ..... 60&5%
No. 870 ..... 40%

# Wads—*Price per M.*

*B. E., 11 up ..... 60¢*
*B. E., 9 and 10 ..... 70¢*
*B. E., 8 ..... 80¢*
*B. E., 7 ..... 80¢*
*P. E., 11 up ..... $1.00*
*P. E., 9 and 10 ..... 1.25*
*P. E., 8 ..... 1.50*
*P. E., 7 ..... 1.50* — *Dis. 15%*
*Ely's B. E., 11 and larger. $1.70@1.75*
*Ely's P. E., 12 to 20 .... $3.00@3.25*

## Ware, Hollow—

## Cast Iron, Hollow—

*Stove Hollow Ware:*
*Enameled ..... 50@55&10%*
*Ground ..... 55@60&10%*
*Plain or Unground .. 60@65&10%*
*Country Hollow Ware, per 100 lbs. ..... $2.75@3.00*
*White Enameled Ware:*
*Maslin Kettles ..... 70%*
*Covered Wares*
*Tinned and Turned ..... 40%*
*Enameled ..... 50%*
See also *Pots, Glue.*

## Enameled—

Agate Nickel Steel Ware ..... 50&20%
Agate Nickel Steel Ware, Specials. 60&15%
Iron Clad Ware ..... 70&10%
Lava, Enameled ..... 40&10%
Never Break Enameled ..... 50%

## Tea Kettles—

*Galvanized Tea Kettles:*

| *Inch* | 6 | 7 | 8 | 9 |
|---|---|---|---|---|
| *Each* | 45¢ | 50¢ | 55¢ | 65¢ |

## Steel Hollow Ware—

Avery Spiders and Griddles .. 65@65&5%
Avery Kettles ..... 60%
Porcelained ..... 50&50&10%
Never Break Spiders and Griddles .. 65&5%
Never Break Kettles ..... 60%
Solid Steel Spiders and Griddles. 65&5%
Solid Steel Kettles ..... 60%

## Warmers, Foot—

Pike Mfg. Co., Soapstone .... 40@40&10%

## Washboards—

Solid Zinc: ℔ doz.
Crescent, family size, bent frame. $3.00
Red Star, family size, stationary protector ..... $3.00
Double Zinc Surface:
Saginaw Globe, family size, stationary protector ..... $2.65
Cable Cross, family size, stationary protector ..... $2.90
Single Zinc Surface:
Naiad, family size, open back, perforated ..... $2.40
Saginaw Globe, protector, family size, ventilated back ..... $2.25
Brass Surface:
Brass King, Single Surface, open back ..... $3.00
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface ..... $3.00
Glass Surface:
Glass King, Single Surface, open back ..... $3.00
Enamel Surface:
Enamel King, Single Surface, ventilated back ..... $3.00

## Washers—Leather, Axle—

*Solid ..... 8¢&10¢&80¢&10¢&10%*
*Patent ..... 90¢&90¢&5%*
*Coil: ⅞ 1 1¼ 1¼ Inch. 10¢ 11¢ 12¢ 13¢ per box*

## Iron or Steel—

*Size bolt .... 5-16 ⅜ ½ ⅝ ¾*
*Washers ... $4.95 4.05 2.75 2.55 2.35*
*In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.*

## Cast Washers—

*Over ½ inch, barrel lots ..... per lb. 1¾@2¢*

## Wedges—

*Oil Finish ..... lb. 2.15@2.30¢*

## Weights—Hitching—

Covert Mfg. Co. ..... 40&2%
Covert's Saddlery Works ..... 60&10%

## Sash—

*Per ton, f.o.b. factory:*
*Eastern District ..... $25.00*
*Southern Territory .. $19.00@20.00*
*Western and Central Districts ..... $20.00@21.00*

## Wheels, Well—

*8-in., $1.50@1.55; 10-in., $1.65@1.70; 12-in., $2.25@2.35; 14-in., $3.40@3.50.*

## Wire and Wire Goods—

*Bright and Annealed:*
*6 to 9 ..... 80¢&5@80¢&7½%*
*10 to 18 ..... 80@80&5%*
*19 to 26 ..... 80¢&10¢@80¢&10¢&5%*
*27 to 36 ..... 80¢&5@80¢&10%*
*Galvanized:*
*6 to 9 ..... 77½@77½@&5%*
*10 to 14 ..... 72½@72½@&5%*
*15 to 16 ..... 75¢&7½@75¢&10¢&2½%*
*19 to 26 ..... 75¢&5@75¢&10%*
*27 to 36 ..... 72½@&5@72¢&7½%*
*Coppered:*
*6 to 9 ..... 77½@77½@&5%*
*10 to 14 ..... 77½@77½@&7½%*
*15 to 18 ..... 75¢&10¢@75¢&10¢&2½%*
*19 to 26 ..... 75¢&10¢&5@80%*
*27 to 36 ..... 75@75¢&5%*
*Tinned:*
*6 to 14 ..... 77½@77½@&7½%*
*15 to 18 ..... 75¢&5@75¢&10%*
*Annealed, Steel and Tinned, on Spools .. 70¢&10¢&10¢@70¢&10¢&10¢&10%*
*Brass and Copper on Spools ... 60¢&10¢@60¢&10¢&10%*
*Brass, list Feb. 26, '96 ..... 30¢&5%*
*Copper, list Feb. 26, '96 ..... 15%*
*Cast Steel Wire ..... 50%*
Wire Clothes Line, see Lines.
Wire Picture Cord, see Cord.

## Bright Wire Goods—

*List June 24, 1903. 90¢&10¢&10¢&10@.. %*

## Wire Cloth and Netting—

*Galvanized Wire Netting ..... 80¢&15@80¢&17½%*
*Painted Screen Cloth, 100 ft., $1.20*
*Standard Galv. Hardware Grade:*
*Nos. 2, 2½ & 3 Mesh, sq. ft. 3 ¢*
*Nos. 4 and 5 Mesh, sq. ft. 3½¢*
*No. 6 Mesh, sq. ft. ..... 3½¢*
*No. 8 Mesh, sq. ft. ..... 4 ¢*

## Wire, Barb—See *Trade Report*

## Wrenches—

*Agricultural .... 75¢&10@75¢&10¢&10%*
*Alligator or Crocodile .. 70¢&10@75%*
*Baxter Pattern S Wrenches .. 70¢&5@70¢&10%*
*Drop Forged S ..... 45@45¢&5%*
Acme ..... 60&10%
Alligator Pattern ..... 70%
Bull Dog ..... 70%
Bemis & Call's:
Adjustable S ..... 40%
Adjustable S Pipe ..... 40%
Bemis Pipe ..... 60%
Briggs Pattern ..... 40%
Combination Black ..... 40&5%
Combination Bright ..... 40%
Merrick Pattern ..... 50%
Boardman's ..... 33⅓%
Coes' Genuine Knife Hdl .. 40&10&5&5%
Coes' Genuine Steel Hdl .. 40&10&5&5%
Coes' Genuine Key Model .. 40&10&5&5%
Coes' "Mechanics'" ... 40&10&10&5&5%
Donohue's Engineer ..... 40&10%
Eagle ..... 50&10%
Elgin Wrenches ..... 40%
Elgin Monkey Wrench Pipe Jaws. 33⅓%
Gem Pocket ..... 30%
Hercules ..... 70%
W. & B. Machinist:
Case lots ..... 50&5%
Less than case lots ..... 50%
Improved Pipe (W. & B.) ..... 60%
Solid Handles, P., S. & W. .. 50@50&5%
Stillson ..... 65%
Vulcan Chain ..... 50%

## Wrought Goods—

*Staples, Hooks, &c., list March 17, '92 ..... 90¢@90¢&10%*

# Yokes, Neck—

Covert Saddlery Works, Trimmed .. 70%
Covert Saddlery Works, Neck Yoke Centers ..... 70%

## Yokes, Ox, and Ox Bows—

Fort Madison's Farmers' & Freighters' ..... list net

# Zinc—

*Sheet .... per 100 lbs., $7.35@7.60*

# CURRENT METAL PRICES.

## JANUARY 4, 1905.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

### IRON AND STEEL—

#### Bar Iron from Store—

Refined Iron:
1 to 1¾ in. round and square ₩ lb 1.75@1.80¢
1½ to 4 in. x ⅜ to 1 in. ₩ lb 1.75@1.80¢
1¾ to 4 in. x ¼ to 5-16 ₩ lb @1.95¢
Rods—⅜ and 11-16 round and square ₩ lb 1.95 @2.00¢

| Angles: | Cts ₩ lb |
|---|---|
| 3 in. x ¾ in. and larger | 2.00¢ |
| 3 in. x 3-16 in. and ⅛ in. | 2.25¢ |
| 1½ to 2½ in. x ¼ in. | 2.05¢ |
| 1½ to 2½ in. x 3-16 in and thicker | 2.05¢ |
| 1 to 1¼ in. x 3-16 in. | 2.00¢ |
| 1 to 1¼ x ⅛ in. | 2.10¢ |
| ⅝ x ⅛ in. | 2.25¢ |
| ¾ x ⅛ in. | 2.35¢ |
| ⅞ x ⅛ in. | 3.40¢ |
| 1 x ⅛ in. | 3.90¢ |
| ¼ x 3-32 in. | 3.90¢ |
| Tees: | |
| 1 in. | 2.45¢ |
| 1¼ in. | 2.25¢ |
| 1½ to 2¼ in. | 2.15¢ |
| 3 in. and larger | 2.30¢ |
| Beams | 2.00¢ |
| Channels, 3 in. and larger | 3.00¢ |
| Bands—1½ to 6 x 3-16 to No. 8 ₩ lb | 2.10¢ |
| "Burden's Best" Iron, base price ₩ lb | 3.05¢ |
| Burden's "H. B & S. Iron, base price ₩ lb | 2.85¢ |
| "Ulster" ₩ lb | 3.10¢ |
| Norway Bars | 3.25@3.75¢ |
| Norway Shapes | 3.75@4.25¢ |

#### Merchant Steel from Store—

| | per lb |
|---|---|
| Bessemer Machinery | 1.80¢ |
| Toe Calk, Tire and Sleigh Shoe | 2.00@2.50¢ |
| Best Cast Steel, base price in small lots | 7¢ |

#### Soft Steel Sheets—

| | | | |
|---|---|---|---|
| ¼ inch | 2.15¢ | No. 14 | 2.35¢ |
| 5-16 inch | 2.20¢ | No. 16 | 2.40¢ |
| No. 8 | 2.25¢ | No. 18 | 2.55¢ |
| No. 10 | 2.25¢ | No. 20 | 2.55¢ |
| No. 12 | 2.30¢ | No. 22 | 2.60¢ |

#### Sheet Iron from Store.

##### Black.

| | One Pass, C. R. Soft Steel | R. G. Cleaned. |
|---|---|---|
| No. 14 ₩ lb | 2.50 | 2.60¢ |
| No. 16 ₩ lb | 2.55 | 2.70¢ |
| Nos. 18 to 21 ₩ lb | 2.65 | 2.80¢ |
| Nos. 22 to 24 ₩ lb | 2 70 | 2.90¢ |
| Nos. 25 and 26 ₩ lb | 2.75 | 3.00¢ |
| No. 27 ₩ lb | 2.80 | 3.10¢ |
| No. 28 ₩ lb | 2.90 | 3.20¢ |

#### Russia, Planished, &c.

Genuine Russia, according to assortment ₩ lb 11½@14¢
Patent Planished ₩ lb A, 10¢; B, 9¢, net.

#### Galvanized.

Nos. 14 to 16 ₩ lb, 2.95¢
Nos. 18 to 20 ₩ lb, 3.15¢
Nos. 22 to 24 ₩ lb, 3.35¢
No. 26 ₩ lb, 3.55¢
No. 27 ₩ lb, 3.80¢
No. 28 ₩ lb, 4.05¢
No. 30 ₩ lb, 4.95¢
No. 20 and lighter, 36 inches wide, 25¢ higher.

#### Foreign Steel from Store—

Best Cast ₩ lb 15 ¢
Extra Cast ₩ lb 18 @ 20 ¢
Swaged, Cast ₩ lb 16 ¢
Best Double Shear ₩ lb 15 ¢
Blister, 1st quality ₩ lb 13 ¢
German Steel, Best ₩ lb 10 ¢
2d quality ₩ lb 9 ¢
3d quality ₩ lb 8 ¢
Sheet Cast Steel, 1st quality ₩ lb 15 ¢
2d quality ₩ lb 14 ¢
3d quality ₩ lb 12 ¢
R. Mushet's "Special" ₩ lb 46 ¢
" " "Titanic" ₩ lb 19 ¢
Hobson's Choice XX Extra Best ₩ lb 35 ¢
Jessop Self Hardening ₩ lb 45 ¢
Seamans' "Nelson" Steel 40 ¢
Hobson's "Soho" Special Self-Hardening ₩ lb 43 ¢

### METALS—

#### Tin—

Duty.—Pigs, Bars and Block. Free. Per lb
Banca, Pigs 30¼@30¾¢
Straits, Pigs 30 @30¼¢
Straits in Bars 31 @31¼¢

#### Tin Plates—

##### American Charcoal Plates.

Calland Grade:
IC, 14 x 20 $6.45
IX, 14 x 20 7.95
Melyn Grade:
IC, 14 x 20 5.95
IX, 14 x 20 7.20
Allaway Grade:
IC, 14 x 20 5.20
IX, 14 x 20 6.30

##### American Coke Plates—Bessemer—

IC, 14 x 20 .....108 lb $4.30
IX, 14 x 20 $5.50

##### American Terne Plates—

IC, 20 x 28 $8.50
IX, 20 x 28 $10.50

#### Copper—

Duty: Pig, Bar and Ingot and Old Copper free. Manufactured, 2½¢ ₩ lb.

##### Ingot—

Lake 15¾@16 ¢
Casting 15½@15¾¢

#### Sheet and Bolt—

October 22, 1903. Net

Prices, in cents per pound.

Sheet 30 x 60.

| Not wider than | Not longer than | And longer than | 64 oz. & over, 50 lb. sheet, 30 x 60 and heavier. | 32 oz. to 64 oz. 25 to 50 lb. | 24 oz. to 32 oz. 18¾ to 25 lb. | 16 oz. to 24 oz. 12½ to 18¾ lb. | 14 oz. and 15 oz. 11 to 11¼ lb. | 12 oz. and 13 oz. 9⅝ to 11 lb. | 10 oz. and 11 oz. 7⅞ to 9⅝ lb. | 8 oz. and 9 oz. 6¼ to 7⅞ lb. | Lighter than 8 oz. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ins. | Ins. | Ins. | | | | | | | | | |
| 30 | 72 | ..... | 18 | 19 | 19 | 19 | 20 | 21 | 22 | 23 | 25 |
| 30 | 96 | 72 | 18 | 19 | 19 | 19 | 20 | 22 | 25 | 25 | |
| 30 | ..... | 96 | 18 | 19 | 19 | 19 | 21 | 25 | | | |
| 36 | 72 | ..... | 18 | 19 | 19 | 19 | 21 | 23 | 26 | 29 | |
| 36 | 96 | 72 | 18 | 19 | 19 | 19 | 21 | 25 | 28 | | |
| 36 | 120 | 96 | 18 | 19 | 19 | 20 | 22 | 25 | | | |
| 36 | ..... | 120 | 18 | 19 | 18 | 21 | | | | | |
| 48 | 72 | ..... | 18 | 19 | 18 | 21 | 23 | 26 | 29 | | |
| 48 | 96 | 72 | 18 | 19 | 18 | 22 | 24 | 27 | | | |
| 48 | 120 | 96 | 18 | 19 | 21 | 23 | 27 | | | | |
| 48 | ..... | 120 | 18 | 20 | 22 | 25 | | | | | |
| 60 | 72 | ..... | 19 | 19 | 20 | 22 | 25 | 30 | | | |
| 60 | 96 | 72 | 18 | 19 | 21 | 23 | 25 | | | | |
| 60 | 120 | 96 | 18 | 20 | 22 | 25 | | | | | |
| 60 | ..... | 120 | 18 | 21 | 23 | 27 | | | | | |
| 72 | 96 | ..... | 18 | 22 | 22 | 27 | | | | | |
| 72 | 120 | 96 | 18 | 21 | 24 | 29 | | | | | |
| 72 | ..... | 120 | 19 | 22 | 27 | | | | | | |
| 108 | 96 | ..... | 19 | 22 | 25 | | | | | | |
| 108 | 120 | 96 | 20 | 23 | 26 | | | | | | |
| 108 | ..... | 120 | 21 | 24 | 28 | | | | | | |
| wider than 108 | 132 | ..... | 22 | 25 | | | | | | | |
| | ..... | 132 | 23 | 24 | | | | | | | |

Circles, Segments and Pattern Sheets, 3¢ ₩ lb advance over price of Sheet Copper required to cut them from.
Cold or Hard Rolled Copper 14 oz. ₩ square foot and heavier, 1¢ ₩ lb over the foregoing prices.
Cold or Hard Rolled Copper, lighter than 14 oz. ₩ square foot, 2¢ ₩ lb over the foregoing prices.
All Polished Copper, 20 in. wide and under, 1¢ ₩ lb advance over the price for Cold Rolled Copper.
All Polished Copper, over 20 in. wide, 2¢ ₩ lb advance over the price for Cold Rolled Copper.

#### Planished Copper—

1¢ ₩ lb more than Polished Copper.

#### Copper Bottoms, Pits and Flats—

14 oz. to square foot and heavier, ₩ lb ..... 23¢
12 oz. and up to 14 oz. to square foot, ₩ lb ..... 24¢
10 oz. and up to 12 oz., ₩ lb ..... 26¢
Lighter than 10 oz., ₩ lb ..... 29¢
Circles less than 8 in. diameter, 2¢ ₩ lb additional
Circles over 13 in. diameter are not classed as Copper Bottoms.
Polished Copper Bottoms and Flats, 1¢ ₩ lb extra.

#### Copper Wire—

Hard and S. Drawn—B. & S. Gauge.
*List Feb. 20, 1901.*

| Nos. | 0000 to 8 | 9 and 10 | 11 and 12 |
|---|---|---|---|
| | Base | ½¢ | ¾¢ ₩ lb adv. |
| Nos. | 13 | 14 | 15 16 |
| | ½¢ | ¾¢ | 1¼¢ ₩ lb adv. |
| Nos. | 17 | 18 | 19 20 |
| | 1¾¢ | 2¢ | 2¾¢ ₩ lb adv |

#### Seamless Brass Tubes—

Standard always Stubs' gauge, unless otherwise ordered.
Feb. 19, 1904. Net. Outside Diameter.

| Stubs' W.G. | B. & S. W.G. | ¼ | 5-16 | ⅜ | 7-16 | ½ | 9-16 | ⅝ | ¾ | ⅞ | 1 | 1¼ | 1½ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4-11 | 3- 9 | ... | ..... | ... | ..... | ... | ..... | ... | ... | ... | ... | 18 | 18 |
| 12 | 10 | ... | ..... | ... | ..... | ... | ..... | 24 | 24 | 23 | 23 | 18 | 18 |
| 13 | 11 | ... | ..... | ... | ..... | ... | ..... | 25 | 25 | 23 | 23 | 18 | 18 |
| 14 | 12 | ... | ..... | ... | ..... | 25 | 25 | 25 | 23 | 23 | 23 | 19 | 19 |
| 15 | 13 | ... | ..... | 26 | 26 | 25 | 25 | 25 | 23 | 23 | 23 | 19 | 19 |
| 16 | 14 | ... | 26 | 26 | 26 | 25 | 25 | 25 | 23 | 23 | 23 | 20 | 20 |
| 17 | 15 | ... | 26 | 26 | 26 | 25 | 25 | 25 | 23 | 23 | 23 | 21 | 21 |
| 18 | 16 | 49 | 31 | 27 | 27 | 26 | 26 | 26 | 24 | 24 | 24 | 22 | 22 |
| 19 | 17 | 58 | 31 | 27 | 27 | 26 | 26 | 26 | 24 | 24 | 24 | 23 | 23 |
| 20 | 18-19 | 60 | 31 | 27 | 27 | 26 | 26 | 26 | 24 | 24 | 24 | 24 | 24 |
| 21 | 20 | 60 | 47 | 29 | 28 | 28 | 26 | 25 | 25 | 25 | 25 | 25 | 25 |
| 22 | 21 | 67 | 52 | 31 | 31 | 29 | 29 | 27 | 26 | 26 | 26 | 26 | 26 |
| 23 | 22 | 74 | 57 | 33 | 33 | 31 | 31 | 29 | 29 | 29 | 29 | 29 | 29 |
| 24 | 23 | 77 | 60 | 42 | 44 | 42 | 41 | 42 | 39 | 37 | 36 | 36 | 37 |
| 25 | 24 | 82 | 67 | 52 | 47 | 45 | 43 | 42 | 41 | 40 | 40 | 41 | 42 |

Copper Bronze and Gilding Tube, 3¢ ₩ lb additional

#### Iron Pipe Sizes—Brass

| ⅛ | ¼ | ⅜ | ½ | ¾ | 1 | 1¼ | 1½ | 2 | 2½ | 3 | 3½ | 4 | 4½ | 5 | 6 inch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | 32 | 30 | 27 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 23 | 23 | 25 | 27 | 28¢₩ lb |

Copper, Bronze or Gilding Tubes, 3¢ ₩ lb additional

#### Brazed Brass Tubing.

(*To No. 19, inclusive.*) June 6, 1898.
Brown & Sharpe's gauge standard.

| | | | | Per lb. |
|---|---|---|---|---|
| Plain Round Tube, ¾ in. | up to | 2 in. | | $0.35 |
| " " ⅞ | " | 2¼ " | | .36 |
| " " 1 | " | 2½ " | | .38 |
| " " 1¼ | " | 2¾ " | | .41 |
| " " 5-16 | " | ⅝ " | | .48 |
| " " ¼ | " | 5-16" | | .65 |
| " " 3-16 | " | ¼ " | | 1.00 |
| " " ⅛ | " | 3-16" | | 1.50 |
| Smaller than ¼ inch | | | | Special |
| ½ inch to 3 inch, to No. 19, inclusive | | | | .35 |
| 3 inch | | | | .40 |
| Over 3 inch to 3½ inch, inclusive | | | | .45 |
| Over 3½ inch | | | | .50 |

Bronze and Copper, advance on Brass List, 3 cents.
Discount from list ¢ 25%

#### Roll and Sheet Brass—

(*Brown & Sharpe Standard Gauge.*)

| Common High Brass Wider than and including | in. 2 12 | in. 12 14 | in. 14 16 | in. 16 18 | in. 18 20 | in. 20 22 | in. 22 24 | in. 24 26 |
|---|---|---|---|---|---|---|---|---|
| To No. 20 inclusive | .22 | .23 | .25 | .27 | .29 | .31 | .33 | .36 |
| Nos. 21 22, 23 and 24 | .22 | .24 | .26 | .28 | .30 | .32 | .34 | .37 |
| Nos. 25 and 26 | .23 | .24½ | .27 | .29 | .31 | .33 | .35 | .38 |
| Nos. 27 and 28 | .23 | .25 | .28 | .30 | .32 | .34 | .36 | .39 |

| Common High Brass Wider than and including | in. 26 28 | in. 28 30 | in. 30 32 | in. 32 34 | in. 34 36 | in. 36 38 | in. 38 40 | in. 40 |
|---|---|---|---|---|---|---|---|---|
| To No. 20, inclusive | .39 | .42 | .46 | .50 | .55 | .60 | .65 | * |
| Nos. 21, 22, 23 and 24 | .40 | .43 | .47 | .51 | .56 | .61 | .68 | |
| Nos. 25 and 26 | .41 | .44 | .48 | .52 | .57 | .63 | .71 | |
| Nos. 27 and 28 | .42 | .45 | .49 | .53 | .58 | .65 | .75 | |

* Special prices not less than 80 cents.
Add ½¢ ₩ lb additional for each number thinner than Nos. 28 to 38 inclusive. Discount from List 25%

#### Wire in Coils.

List February 26, 1896.

| Brown & Sharpe's gauge the standard. | Com. high brass. | Low brass. | Gild'g bronze and copper |
|---|---|---|---|
| All Nos. to No. 10, inclusive | $0.23 | $0.27 | $0.28 |
| Above No. 10 to No. 16 | .23½ | .27½ | .28¼ |
| No. 17 and No. 18 | .24 | .28 | .32 |
| No. 19 and No. 20 | .25 | .29 | .33 |
| No. 21 | .26 | .30 | .34 |
| No. 22 | .27 | .31 | .35 |
| No. 23 | .28 | .32 | .36 |
| No. 24 | .30 | .34 | .38 |
| No. 25 | .32 | .36 | .40 |
| No. 26 | .35 | .39 | .43 |
| No. 27 | .38 | .42 | .46 |
| No. 28 | .42 | .46 | .51 |
| No. 29 | .45 | .49 | .54 |
| No. 30 | .48 | .52 | .62 |
| No. 31 | .51 | .55 | .67 |
| No. 32 | .55 | .59 | .73 |
| No. 33 | .59 | .63 | .82 |
| No. 34 | .64 | .68 | .95 |
| No. 35 | .70 | .74 | 1.30 |
| No. 36 | .76 | .80 | 1.50 |
| No. 37 | 1.00 | 1.04 | 1.70 |
| No. 38 | 1.30 | 1.34 | 2.00 |
| No. 39 | 2.00 | 2.00 | 3.25 |
| No. 40 | 2.60 | 2.60 | 5.75 |

Discount, Brass Wire, 25%; Copper Wire, Net.
List November 16, 96.
Spring Wire, 2¢ ₩ lb advance.

#### Tobin Bronze—

Straight, but not turned, Rods, ⅝ to 3 in. diameter, ₩ lb, net 18¢
Finished Piston Rods, ⅝ to 2½ in. diameter, ₩ lb net, 19¢
Other sizes and extreme lengths, special prices.

#### Spelter—

Duty: In Blocks or Pigs, 1¢ ₩ lb
Western Spelter 6¼@6⅝¢

#### Zinc.

Duty: Sheet, 2¢ ₩ lb.
No. 9, base, casks 7½¢ | Open per lb 8¢

#### Lead.

Duty: Pigs and Bars and Old, 2½¢ ₩ lb. Pipe and Sheets, 2¾¢ ₩ lb.
American Pig 5 @5¼¢
Bar 5¼@6 ¢
Old Lead in exchange, 4¢ ₩ lb

#### Solder.

½ & ¼ guaranteed 19½@20¢
No. 1 17½@18¢
Prices of Solder indicated by private brand vary according to composition.

#### Antimony—

Duty, ¾¢ ₩ lb.
Cookson ₩ lb 10@10½¢
U. S 8¾@9 ¢
Hungarian 8½@8¾¢

#### Aluminum—

Duty: Crude, 8¢ ₩ lb. Plates, Sheets, Bars and Rods, 13¢ ₩ lb.
No. 1 Aluminum (guaranteed over 99% pure), in ingot for remelting:
Small lots ₩ lb 37¢
100-lb lots ₩ lb 35¢
No. 2 Aluminum (guaranteed to be over 96% pure), in ingots for remelting:
Small lots ₩ lb 34¢
100-lb lots ₩ lb 33¢
Aluminum Sheet, B. & S. gauge. 50 lb or more

| Wider than | 6-in. | 14-in. | 24-in. |
|---|---|---|---|
| And including | 14-in. | 24-in. | 30-in. |
| | ₩ lb. | ₩ lb. | ₩ lb. |
| Nos. 13 to 19 | $0.43 | $0.44 | $0.47 |
| No. 20 | .44 | .46 | .49 |
| Nos. 21 to 23 | .46 | .48 | .51 |
| No. 24 | .46 | .50 | .53 |
| No. 25 | .47 | .51 | .54 |
| No. 26 | .47 | .54 | .59 |
| No. 27 | .48 | .57 | .62 |
| No. 28 | .48 | .57 | .64 |
| No. 29 | .49 | .60 | .69 |
| No. 30 | .50 | .64 | .77 |

*Note.*—Lots of less than 50 lb 5¢ ₩ lb extra.

Aluminum Wire, B. & S. Gauge.
Larger than No. 9 ₩ lb 40¢ | No. 15 ₩ lb 43¢
No. 9 to No. 10 ₩ lb 40½¢ | No. 17 ₩ lb 50¢
No. 11 ₩ lb 41 ¢ | No. 18 ₩ lb 55¢
No. 12 ₩ lb 41½¢ | No. 19 ₩ lb 60¢
No. 13 ₩ lb 42 ¢ | No. 20 ₩ lb 65¢
No 14 ₩ lb 42½¢ | No. 21 ₩ lb 85¢

#### Old Metals.

*Dealers' Purchasing Prices Paid in New York.*

Heavy Copper ₩ lb 12¾¢
Light and Tinned Copper ₩ lb 11¾¢
Heavy Brass ₩ lb 8 ¢
Light Brass ₩ lb 6¾¢
Lead ₩ lb 4½¢
Tea Lead ₩ lb 4 ¢
Zinc ₩ lb 4 ¢
No. 1 Pewter ₩ lb 19 ¢
No. 2 Pewter ₩ lb 8½¢
Pure Aluminum, Sheet, ₩ lb 21¢
Cast Aluminum, ₩ lb 16¢
Tin Plate scrap ₩ ton $ @$5 00
Wrought Scrap Iron ₩ gross ton $13.00@13.50
Heavy Cast Scrap ₩ gross ton $11.50@12 00
Stove Plate Scrap ₩ gross ton $10.00@10.50
Burnt Iron ₩ gross ton $6.50@ 7.00